MATHEMATICS

GRADE THREE

MODULE 4

MULTIPLICATION AND DIVISION

Alberta
LEARNING

Learning Technologies Branch

GRADE THREE MATHEMATICS: MODULE 4
MULTIPLICATION AND DIVISION

Grade Three Mathematics
Module 4: Multiplication and Division
Student Module Booklet
Learning Technologies Branch
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This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	

INTERNET

You may find the following Internet sites useful:

- Alberta Learning, **http://www.learning.gov.ab.ca**
- Learning Technologies Branch, **http://www.learning.gov.ab.ca/ltb**
- Learning Resources Centre, **http://www.lrc.learning.gov.ab.ca**

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.
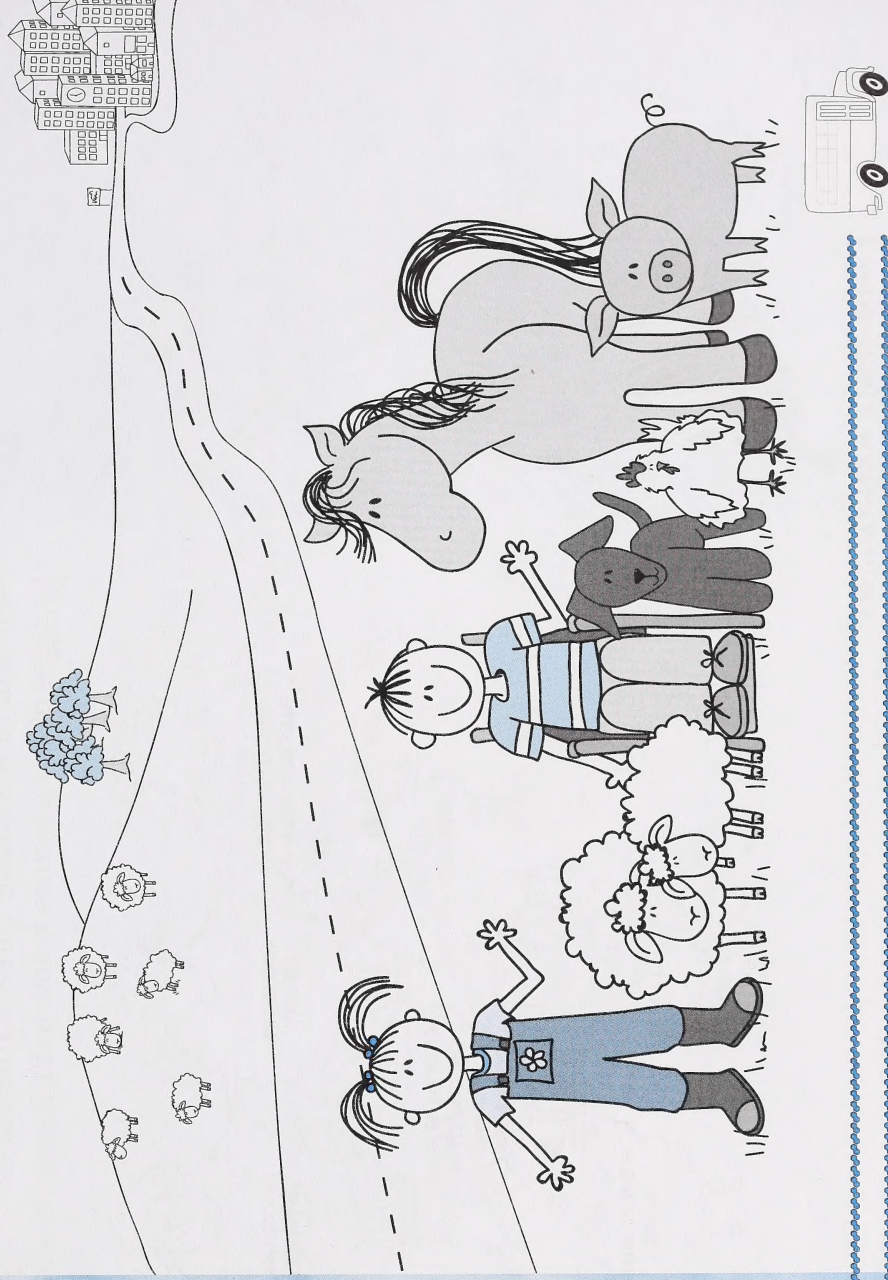
WELCOME
TO GRADE THREE MATHEMATICS

You may not realize it, but you use mathematics many times every day. You are using math when you count the money in your pocket, find a date on the calendar, or sort your toys. As you work through Grade Three Mathematics you will learn how to do many new things. You will also learn how math can be useful in solving everyday problems.

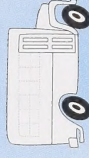Each unit in the Grade Three Mathematics course is called a **module**. Read the titles of the modules below to find out what you will learn about this year.

MODULE 1
ADDITION AND SUBTRACTION

MODULE 2
NUMBERS COUNT

MODULE 3
PATTERNS EVERYWHERE

MODULE 4
MULTIPLICATION AND DIVISION

MODULE 5
MEASUREMENT

MODULE 6
ADDITION AND SUBTRACTION OF LARGE NUMBERS

MODULE 7
DATA AND CHANCE

MODULE 8
SPACE AND SHAPE

MODULE 9
MONEY AND MORE
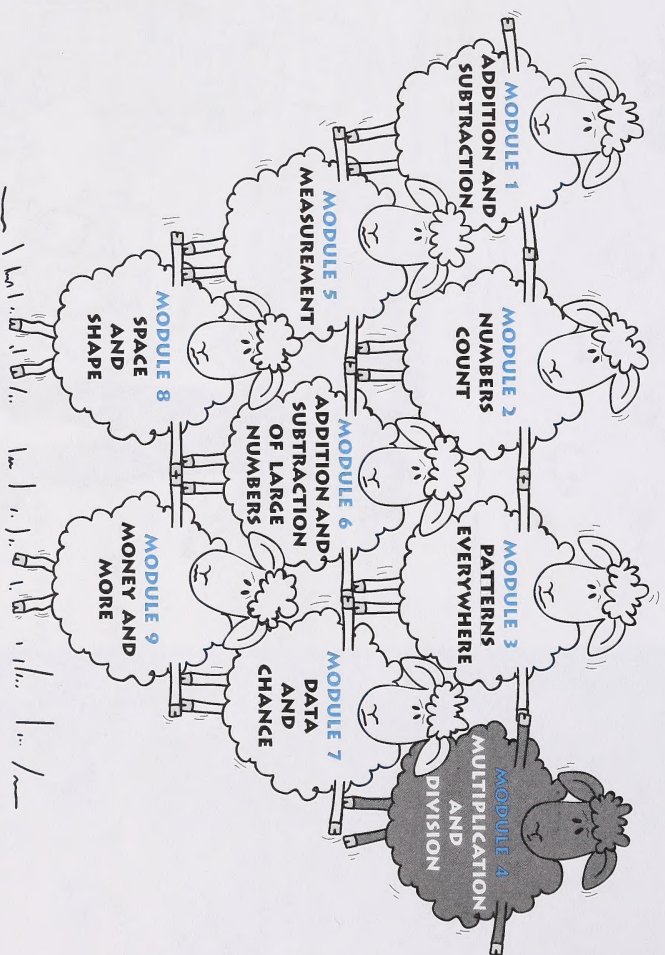
CONTENTS

MODULE 4

MULTIPLICATION AND DIVISION

You have studied addition and subtraction in earlier grades and earlier modules. In this module, you will learn how using groups can help you calculate answers in a quicker way. You will find out how to multiply.

You will also learn about sharing or dividing groups.

Help your student gather these materials and place them in the Math Box for this module. Remove and store materials from previous modules that you will not need for this module.

Tiny stickers are inexpensive and widely available. Students enjoy working with stickers, and stickers work well for showing multiplication arrays.
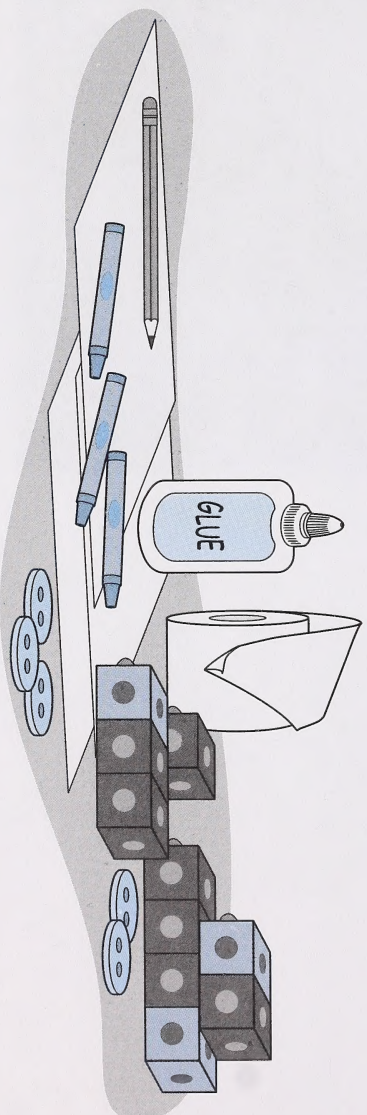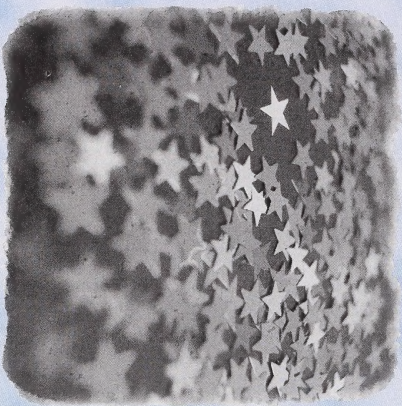
MATERIALS FOR MODULE 4

For Module 4, you will need some of the following items. Small plastic bags or plastic containers are useful to hold your materials.

- an assortment of coins
- buttons (an assortment of sizes, colours, shapes, and holes)
- small stickers or stamps
- interlocking cubes, base ten blocks, or block cutouts from Module 3
- a calculator (The TI-108 is recommended.)
- roll of wide adding-machine paper (optional)
- centimetre ruler or a metre-stick
- glue
- 2 sheets of blank paper (approximately $8\frac{1}{2}$ inches × 11 inches)
- scissors
- stapler

DAY 1: EQUAL GROUPS

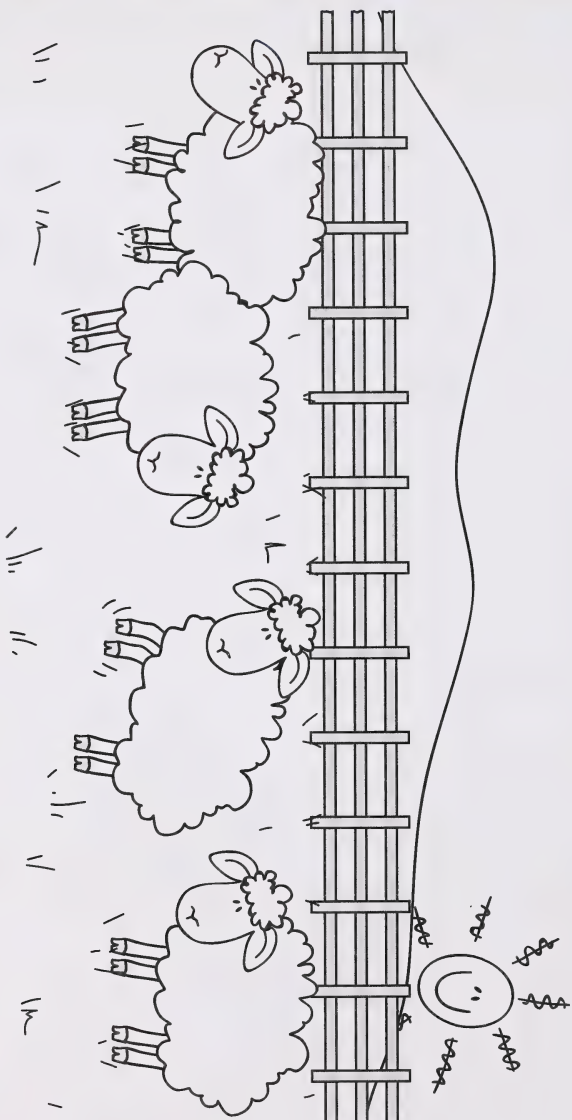Do you remember what equal groups are? Can you think about some things that are shown in equal groups?

In today's activities, you will brainstorm to find objects that come in equal groups. You will solve some problems about these groups too.

LESSON 1

Look at the picture of Sarah's sheep below.

1. How many sheep do you see? _____

2. How many legs are on each sheep? _____

3. How many legs are there in all? _____

EQUAL GROUPS

Tell your home instructor how you figured out how many legs there were in all. Can you think of some other ways that you could figure out how many legs in total were on the four sheep?

You were working with **equal groups** to solve this problem. Having equal groups means that each group has the same number of items. For example, each sheep has the same number of legs.

Think about some other objects that come in equal groups. Look around your home or yard to help you.

4. Write at least two examples for each of the following questions:

a. What comes in groups of 2s?

_____

_____

b. What comes in groups of 3s?

_____

_____

Discuss your student's method to find out the total number of legs on four sheep. Most students will just count, but encourage your student to think of other ways to find out how many legs there are. Your student may suggest repeated addition 4 + 4 + 4 + 4 or counting by 4s.

Remind your student that equal groups mean the same number in each group. An example of using equal groups is skip counting by 2s, 5s, or 10s.

Allow the student to use personal strategies to find answers. Many students will draw or use counters to show the groups. Other students will do repeated addition or skip count. Allow the student to experiment with different methods.

c. What comes in groups of 4s?

_____

_____

d. What comes in groups of 5s?

_____

_____

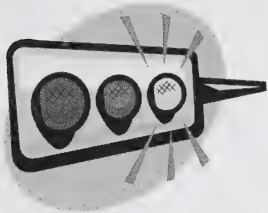## LESSON 2

Use the problem-solving steps to help solve the following problems about groups. Think of a strategy and show your work. Write the answer in a sentence.

Understand the problem.

⬇

Make a plan.

⬇

Try the plan.

⬇

Look back.

EQUAL GROUPS
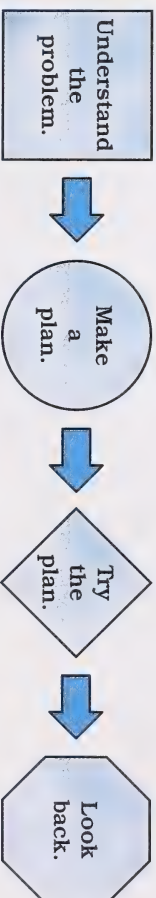
1. How many traffic lights would 4 poles have in all?

2. How many legs do 5 chickens have in all?

3. How many eyes do 8 children have in all?
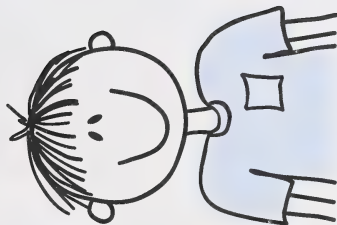
DAY 1

You may have chosen some of these ways to solve the problems:

- draw a picture
- use counters
- skip count
- do repeated addition
- multiplication

$4 \overbrace{8}$
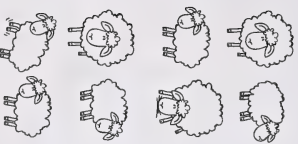
$4+4=8$

$2 \times 4 = 8$

4. Draw a picture to show the following:

   a. 2 groups of 4

b. 6 groups of 3

c. 5 groups of 2

MATH BOX

Take out some pennies or buttons.
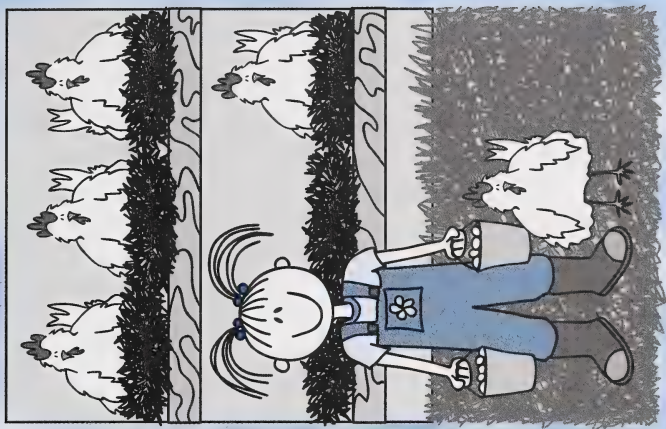
DAY 1

Luke likes to use counters to find the answer.
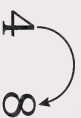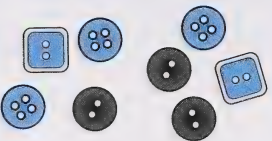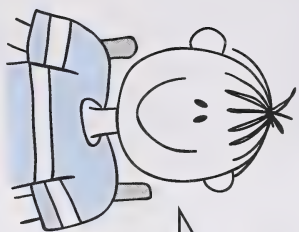
> I need 3 groups with 4 in each group.
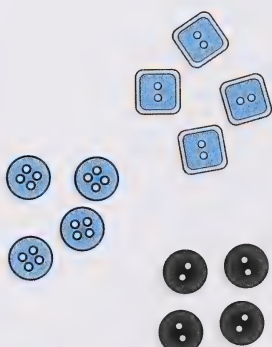
5. Use your pennies or buttons as counters to help Luke find the answers to the following questions.

a. 3 groups of 4 is ———

b. 5 groups of 5 is ———

c. 7 groups of 3 is ———

d. 6 groups of 4 is ———

e. 2 groups of 8 is ———

f. 5 groups of 3 is ———

Go to Assignment Booklet 4A.

DAY 2: ARRAYS

Today, you will have some fun making a sticker booklet to learn about arrays.

Arrays can make it easier to work with equal groups.
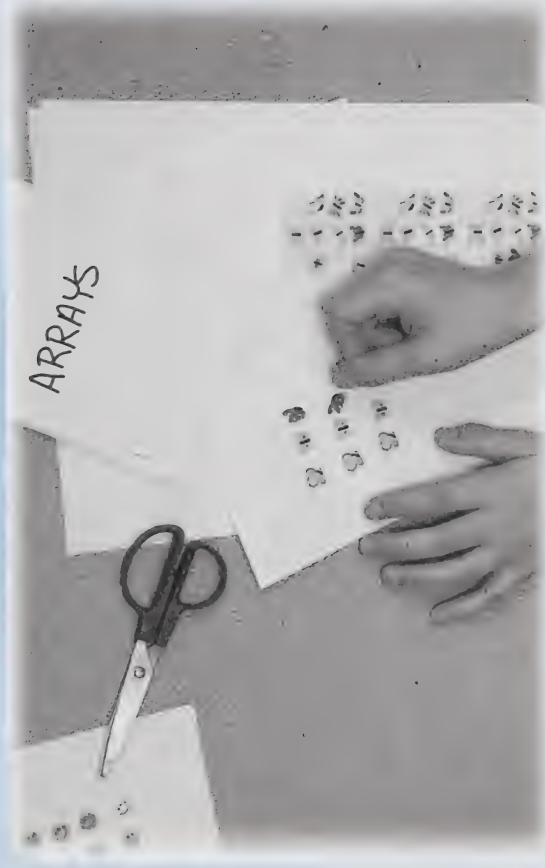
LESSON 1

Luke made 4 groups of 5, like this.
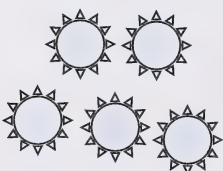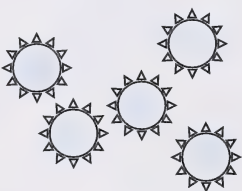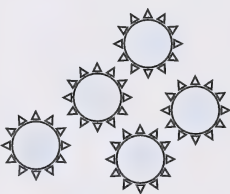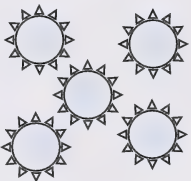
Then he made 4 groups of 5 another way, like this.
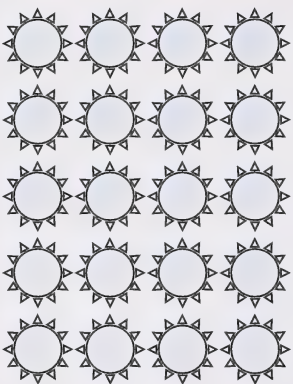
Like Luke, you may have discovered that drawing your groups in rows made them easier to count. It is easy to see that there are 4 groups of 5. When the objects are arranged in rows and columns, the arrangement is called an array.

ARRAYS

You can use an array to show groups when you are drawing pictures or working with real things.

MATH BOX

Take out some buttons or pennies.

1. Show 3 groups of 3 in an array.

Check your student's array. Does it show three rows of three?

a. How many rows of 3 did you make? _____ rows

b. If there are 3 groups of 3, there are _____ in all.

2. Use your buttons or pennies to make an array for each of the following questions. Write the total number of each array.

Be sure the student is making arrays. The buttons or pennies should be aligned in rows and columns.

a. 5 groups of 4 is _____

b. 4 groups of 6 is _____

c. 2 groups of 9 is _____

d. 3 groups of 7 is _____

e. 2 groups of 6 is _____

If stickers are not available, the student may use stamps (homemade or commercial) with an ink pad or draw small pictures to illustrate the arrays.
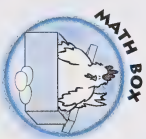
To practise making arrays, Sarah made an Array booklet.

Now, you can make some arrays in a booklet, too.

MATH BOX

Take out your small stickers, blank paper, scissors, and stapler.

- Find two pieces of blank paper.
- Fold the papers in half.
- Cut the papers along the folded line.
- Fold each piece in half, and put it together like a book.
- Staple the papers on the left side.
- Write **Arrays** on the front.

ARRAYS

Use the stickers to make the following arrays. Put one array on each page. **Do not use** the back side of the pages.

- 4 groups of 3
- 2 groups of 5
- 3 groups of 2
- 5 groups of 5
- 4 groups of 2
- 3 groups of 4
- 5 groups of 3

STUDENT FOLDER

Write your name and M4–D2 on the back of the Array booklet. Put it in your Student Folder.

LESSON 2

Interlocking cubes can be used to show arrays.

MATH BOX

Take out your interlocking cubes.
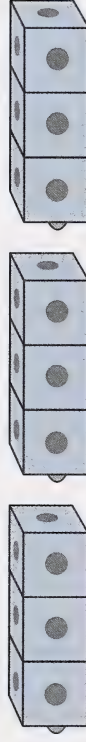
If your student does not have interlocking cubes, base ten blocks or block cutouts from Day 6 of Module 3 may be used.

Make arrays with your interlocking cubes to show the following:

- 3 groups of 4
- 5 groups of 3
- 4 groups of 2

It can be fun to use grid paper to record these arrays, too. Carefully remove all the "Centimetre Grid" paper from the Appendix.

You can cut out the squares to show the arrays.

Example:

To show 3 groups of 4, you cut out a rectangle with 3 rows and 4 columns. Remember that rows go across and columns go up and down.

Rows go across. ⟶

Columns go up and down.
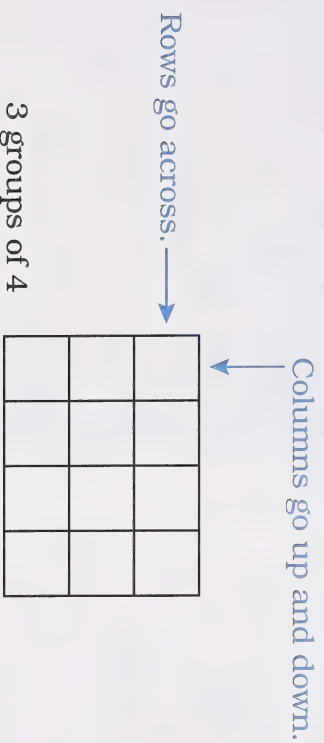
3 groups of 4

Example:

To show 5 groups of 3, you cut out a rectangle with 5 rows and 3 columns.

Rows go across. ⟶

Columns go up and down.
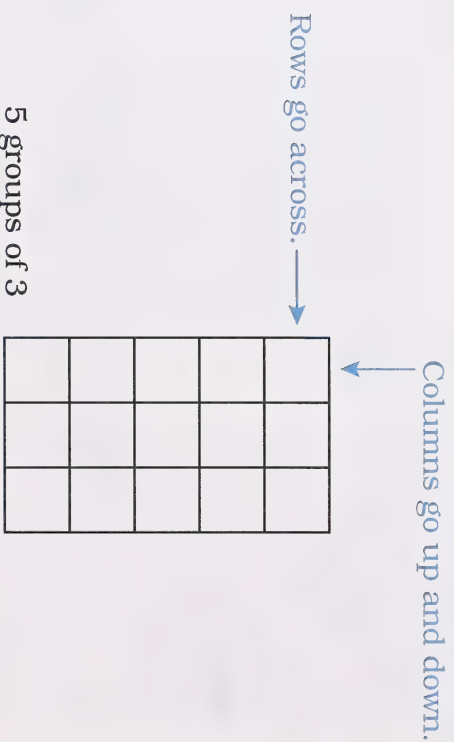
5 groups of 3

ARRAYS

Show each of the following groups with your interlocking cubes. Then use your centimetre grid paper and cut out the array for each. Glue the array in the box.

1.

5 groups of 4

2.

3 groups of 6

3.

4 groups of 7

4.

2 groups of 5

Save all the extra centimetre grid paper in your Student Folder to use later.

Are you ready for your timed exercise? For the next few lessons, you will continue to practise your addition and subtraction facts. Now there are 30 questions on each exercise. Ask your home instructor to time you for 2 minutes and then to mark your answers. Remember to record your scores here and on the Math Facts Graph from the Appendix.

TIMED EXERCISE: 2 MINUTES

$7 + 4 =$ _____ $5 + 8 =$ _____ $8 + 3 =$ _____ $6 + 6 =$ _____ $9 + 4 =$ _____ $4 + 4 =$ _____

$5 + 5 =$ _____ $4 + 7 =$ _____ $7 + 6 =$ _____ $8 + 4 =$ _____ $6 + 8 =$ _____ $9 + 2 =$ _____

$6 + 9 =$ _____ $4 + 5 =$ _____ $9 + 9 =$ _____ $7 + 8 =$ _____ $5 + 3 =$ _____ $8 + 8 =$ _____

$\begin{array}{r} 7 \\ +4 \\ \hline \end{array}$
$\begin{array}{r} 9 \\ +3 \\ \hline \end{array}$
$\begin{array}{r} 8 \\ +1 \\ \hline \end{array}$
$\begin{array}{r} 6 \\ +5 \\ \hline \end{array}$
$\begin{array}{r} 4 \\ +6 \\ \hline \end{array}$
$\begin{array}{r} 5 \\ +7 \\ \hline \end{array}$

$\begin{array}{r} 5 \\ +2 \\ \hline \end{array}$
$\begin{array}{r} 9 \\ +6 \\ \hline \end{array}$
$\begin{array}{r} 7 \\ +7 \\ \hline \end{array}$
$\begin{array}{r} 9 \\ +5 \\ \hline \end{array}$
$\begin{array}{r} 6 \\ +7 \\ \hline \end{array}$
$\begin{array}{r} 4 \\ +8 \\ \hline \end{array}$

Number completed	
Number correct	

DAY 3: WRITING NUMBER SENTENCES

In today's activities, you will practise writing number sentences to tell about equal groups. These number sentences can be repeated addition or multiplication sentences.

WRITING NUMBER SENTENCES

You can write an addition number sentence to tell about equal groups.

For example, you could write 6 groups of 3 as

$3+3+3+3+3+3=18$

The 3 is written 6 times to make 18.

When you solve a problem, such as how many are there in 6 groups of 3, you are also using **multiplication**. Multiplication is a way of finding the total number of items that are in a certain number of equal groups. The times symbol $\times$ indicates multiplication.

Sarah knew the symbol $\times$ meant the same as groups of or times, so she wrote the following:

$6 \times 3 = 18$ or $\begin{array}{r} 3 \\ \times 6 \\ \hline 18 \end{array}$

Sarah had written the multiplication sentence! It read 6 groups of 3 equals 18 or 6 times 3 equals 18.
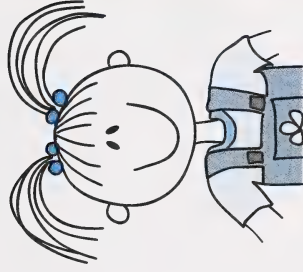
Be sure your student understands the difference between the $+$ symbol and the $\times$ symbol.

1. Write an addition number sentence and then a multiplication number sentence for each of the following:

a. 4 groups of 3 is 12 _____

b. 7 groups of 4 is 28 _____

c. 5 groups of 5 is 25 _____

2. Write a multiplication number sentence for each of the following questions. Read each of the number sentences to your home instructor.

a.

b.

c.

d.

e.

f.

Take out your centimetre grid paper from Day 2.

STUDENT FOLDER

In a multiplication sentence, the numbers that are being multiplied are called the **factors**. The answer is called the **product**.

$$6$$
$$\times\,3 \quad \text{factors}$$
$$\overline{}$$
$$18 \quad \text{product}$$

$$6 \times 3 = 18 \quad \text{product}$$
$$\text{factors}$$

3. From the centimetre grid paper, cut out an array to show each of the following equations. Write the product for the equation, and then glue the array above the number sentence.

a.	b.	c.
$6 \times 3 =$ _____	5 $\times\,3$ ___	$7 \times 2 =$ _____

WRITING NUMBER SENTENCES

d.

9
× 2
___

e.

3 × 8 = _____

Take out your Array booklet that you made on Day 2. Write the multiplication number sentence below each array. When you are finished, put your Array booklet back in your Student Folder. You will send it to your teacher on Day 9.

Go to Assignment Booklet 4A.

DAY 4: LOOKING FOR PATTERNS

Finding patterns can help you do multiplication questions, also.

Today, you will construct a multiplication facts chart to help you discover patterns in multiplication.

LOOKING FOR PATTERNS

LESSON 1

Patterns can make solving equations easier. To show multiplication patterns, Luke made a multiplication facts chart. To help you discover multiplication patterns, you will also make a multiplication facts chart.

Your student will make a multiplication facts chart to discover patterns and use for future reference.

STUDENT FOLDER

Take out your centimetre grid paper.

MATH BOX

Find the roll of adding-machine paper, a centimetre ruler or a metre-stick, scissors, and glue.

If you do not have adding-machine paper, fold a sheet of paper in thirds lengthwise and cut on the lines. Tape the ends together to form a long strip. Repeat as many times as necessary.

- Unroll some adding-machine paper. Use something heavy to hold down the end if you need to.

- Use a centimetre ruler or a metre-stick to draw vertical lines every 10 centimetres as shown. Make 10 lines. You will have ten spaces that are 10 centimetres long. Cut the paper roll at the end of the tenth line.

10 cm

• At the bottom of the first space, write the following:

$1 \times 1 =$

• At the bottom of the next space, write the following:

$1 \times 2 =$

• Continue to write the equations in this way in each space across. Then use your centimetre grid paper to cut out an array for each of the equations. Glue the array above the equation.
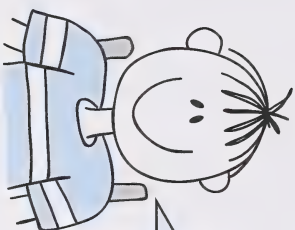
Then I wrote the answer to complete each number sentence.

• Write the answer for each number sentence.

□	⊞	⊞⊞	⊞⊞⊞					
$1 \times 1 = 2$	$1 \times 2 = 2$	$1 \times 3 = 3$	$1 \times 4 = 4$	$1 \times 5 =$	$1 \times 6 =$	$1 \times 7 =$	$1 \times 8 =$	$1 \times 9 =$	$1 \times 10 =$

LOOKING FOR PATTERNS

As the student finishes each strip, check the arrays and answers for accuracy.

1. Look at each number sentence. What pattern do you notice?

Get a new strip of adding-machine paper. In the same way, make a strip for 2 times each number. Make an array for each equation, and complete the number sentence.

2×1=2	2×2=4	2×3=6	2×4=8	2×5=	2×6=	2×7=

Using grid paper arrays makes this easy.

2. Look at each number sentence. What pattern do you notice?

Make a strip for 3 times each number.

3×1=3	3×2=6	3×3=9	3×4=12	3×5=	3×6=	3×7=

3. Look at each number sentence. What pattern do you notice?

_____

Make a strip for 4 times each number.

▯▯▯	▦	▦							
4×1=4	4×2=8	4×3=12	4×4=	4×5=	4×6=	4×7=	4×8=	4×9=	4×10=

4. Look at each number sentence. What pattern do you notice?

_____

Make a strip for 5 times each number.

▯	▦	▦							
5×1=5	5×2=10	5×3=15	5×4=	5×5=	5×6=	5×7=	5×8=	5×9=	5×10=

5. Look at each number sentence. What pattern do you notice?

_____

LOOKING FOR PATTERNS

Ask your home instructor if you can put your strips on a wall or bulletin board near your work area.

If possible, allow your student to post the strips on a wall or other surface near the learning area. Put the strips in sequence to form a multiplication chart.

LESSON 2

Here is Luke's multiplication chart. Does your chart look like Luke's?

	1×1=2	1×2=2	1×3=3	1×4=4	1×5=5	1×6=6	1×7=7	1×8=8	1×9=9	1×10=10
	2×1=2	2×2=4	2×3=6	2×4=8	2×5=10	2×6=12	2×7=14	2×8=16	2×9=18	2×10=20
	3×1=3	3×3=9	3×3=9	3×4=12	3×5=15	3×6=18	3×7=21	3×8=24	3×9=27	3×10=30
	4×1=4		3=12	4×4=16	4×5=20	4×6=24	4×7=28	4×8=32	4×9=36	4×10=40
	5×1=5			=20	5×5=25	5×6=30	5×7=35	5×8=40	5×9=45	5×10=50

3 × 4 = 12
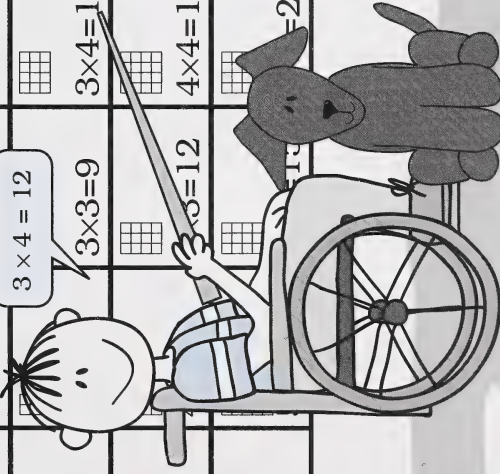
Demonstrate to your student how to look down the row and column to find the multiplication fact. For example, to find 5×5 the student would look across the 5th row to the 5th column.
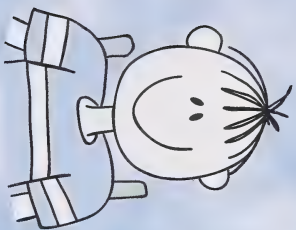
You can use your chart, like Luke did, to help you complete the multiplication number sentences for this lesson. When you learn to use the chart well, it is fun and easy, too.

1. Solve each equation.

a. 5×5 = _____

b. 3×4 = _____

c. 2×6 = _____

d. 4×5 = _____

e. 1×3 = _____

f. 5×10 = _____

g. 3×8 = _____

h. 2×4 = _____

i. 1×9 = _____

j. 5×6 = _____

2. Solve these equations, too.

a. 3
   × 3
   ____

b. 4
   × 2
   ____

c. 7
   × 3
   ____

d. 9
   × 4
   ____

DAY 5: FINDING MULTIPLES

Sarah remembered that hundred charts can also be useful for finding patterns.

You will use a hundred chart to find multiplication patterns today.

LESSON 1

Look at the following hundred chart:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1. What pattern do you see in the first row? _____

2. Colour the squares that will complete the pattern in the rest of the chart.

3. What pattern do you see? _____

_____

When I colour the multiples of 3, 4, and 5, I wonder what patterns I'll see!

This chart shows the **multiples** of 2. If you multiply a number by 2, the answer is a multiple of 2.

1	2	3	4	5
× 2	× 2	× 2	× 2	× 2
2	4	6	8	10

These numbers are multiples of 2.

When you count by 2s, you are finding the multiples of 2.

In the Appendix, find "Multiples of 3," "Multiples of 4," and "Multiples of 5." Remove them carefully.

On the page called "Multiples of 3," colour all the multiples of 3. Remember finding multiples of 3 is the same as counting by 3s.

If necessary, review how to find every third number by counting soft and loud, by using fingers, or by using the calculator. Check each hundred chart for accuracy after the student has completed it.

4. What pattern do you see? _____

On the page called "Multiples of 4," colour all the multiples of 4.

Review how to find every fourth and fifth number, as above, if necessary.

5. What pattern do you see? _____

35

MODULE 4

6. How are multiples of 4 like multiples of 2? _____

_____

On the page called "Multiples of 5," colour all the multiples of 5.

7. What pattern do you see? _____

8. Could you continue the multiples of 5 pattern beyond 100? _____

How would the pattern change? _____

_____

Knowing the multiples of a number can help you find the answer to a multiplication problem.

> If you count by 2s six times, it is the same as finding $2 \times 6 = 12$ or 2, 4, 6, 8, 10, 12.
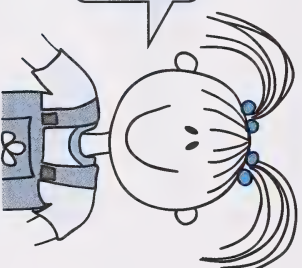
If it is too difficult to keep track of the number of times, the student may use his or her fingers or dots on a paper to keep track.

To multiply 5×5 is the same as counting by 5s five times or adding $5 + 5 + 5 + 5 + 5$.

9. Count by 5s five times and write the answer. $5 \times 5 = \underline{\hspace{2cm}}$

5 \underline{\hspace{1cm}} \underline{\hspace{1cm}} \underline{\hspace{1cm}}

LESSON 2

A hundred chart or a multiples of 3 chart may make it easier to solve a problem like 3×6. For example, on the multiples of 3 chart, to multiply 3×6, you would count by 3s six times.

3, 6, 9, 12, 15, 18
3×6 is 18.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
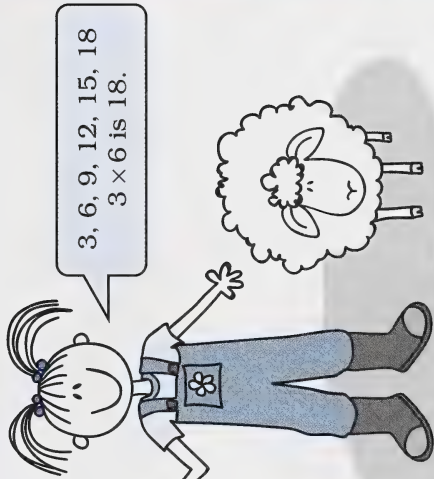
Use your hundred chart to count by the number you are multiplying to find the answers.

1. $4 \times 3 =$ _____   2. $3 \times 7 =$ _____

3. $5 \times 8 =$ _____   4. $2 \times 6 =$ _____

5. $4 \times 9 =$ _____   6. $3 \times 5 =$ _____

7. $5 \times 7 =$ _____   8. $2 \times 8 =$ _____

Put your hundred charts in your folder. You may use them to solve multiplication equations in other lessons.
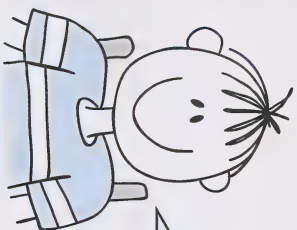
My Assignment Booklet will help me to see how much I remember about multiples. I can come back here to review if I need to.

Go to Assignment Booklet 4A.

DAY 6: MORE MULTIPLICATION STRATEGIES

You have learned many ways to show multiplication and to solve multiplication number sentences. You know how to draw pictures and make arrays to show groups. You have found patterns that can help you solve equations.

In today's lessons, you will learn about multiplying by zero. You will also discover another important fact about multiplication.

Be sure that your student understands that when multiplying by zero, the answer is always zero because it means zero groups or zero in each group.

LESSON 1

Sometimes, the number zero appears in multiplication questions, like 0×3.

$$0 \times 3 = 0 \qquad 3 \times 0 = 0$$

There are 0 groups of 3. Zero or 0 means none, so there are no groups of 3. The answer must be 0.

When 0 is one of the factors, the answer is always 0.

Try the number sentences below.

1. $0 \times 5 =$ _____

2. $0 \times 3 =$ _____

3. $0 \times 8 =$ _____

4. $1 \times 0 =$ _____

5. $100 \times 0 =$ _____

6. $0 \times 35 =$ _____

7. $0 \times 12 =$ _____

8. $4 \times 0 =$ _____

MORE MULTIPLICATION STRATEGIES

LESSON 2

In this activity, your student should discover that the answer remains the same when the factors change order.

Take out the "Centimetre Grid" paper.

Use the grid paper to make arrays for the following number sentences. Glue the arrays above the number sentences and answer the questions.

3 × 4 = _____

4 × 3 = _____

1. What do you notice about the answers? _____

2. Look at the arrays. How are they alike? _____

_____

_____

Cut out arrays for the following number sentences. Glue the arrays above the number sentences and answer the questions.

5 × 4 = _____	4 × 5 = _____

3. What do you notice about the answers? _____

4. Look at the arrays. How are they alike? _____

_____

MORE MULTIPLICATION STRATEGIES

Cut out arrays for the following number sentences. Glue the arrays above the sentences and answer the questions.

2 × 6 = _____

6 × 2 = _____

5. What do you notice about the answers? _____

6. Look at the arrays. How are they alike? _____

_____

7. Make a prediction about the order of the factors in a multiplication number sentence.

_____

8. Write the answers for the following pairs to see if your prediction is true. You may make arrays or use any method you have learned to find the answers.

a. $1 \times 5 =$ _____ $5 \times 1 =$ _____

b. $3 \times 6 =$ _____ $6 \times 3 =$ _____

c. $5 \times 9 =$ _____ $9 \times 5 =$ _____

d. $2 \times 7 =$ _____ $7 \times 2 =$ _____

e. $4 \times 2 =$ _____ $2 \times 4 =$ _____

> Changing the order of the factors does not change the answer in a multiplication equation.

Are you ready for your timed exercise? Ask your home instructor to time you for 2 minutes and then to mark your answers. Remember to record your scores here and on your Math Facts Graph from the Appendix.

MORE MULTIPLICATION STRATEGIES

TIMED EXERCISE: 2 MINUTES

16 – 8 = _____   17 – 7 = _____   12 – 3 = _____   10 – 5 = _____   18 – 9 = _____   15 – 6 = _____

12 – 4 = _____   13 – 5 = _____   15 – 9 = _____   11 – 4 = _____   14 – 7 = _____   8 – 7 = _____

14 – 5 = _____   17 – 8 = _____   13 – 6 = _____   14 – 8 = _____   10 – 3 = _____   11 – 9 = _____

14	12	10	13	11	15
– 6	– 8	– 4	– 9	– 2	– 7

15	16	18	11	9	17
– 8	– 9	– 8	– 3	– 7	– 9

Go to Assignment Booklet 4A.

Number completed	
Number correct	

45

MODULE 4

DAY 7: MAKING A MULTIPLICATION TABLE

Like Luke, on Day 4 you used arrays to make a multiplication facts chart. You also learned how to use this chart to find the answers to multiplication questions.

Today, Luke will show you how to make a multiplication table that can help you do more difficult multiplication questions easier and faster!

X	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										
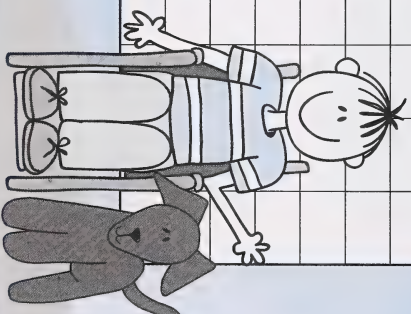
MAKING A MULTIPLICATION TABLE

Look at the following multiplication table. You see a row of numbers on the top and a column of numbers on the left. Remember, rows go across like the seats in a theatre, and columns go up and down like the columns on a building.

Columns go up and down.

Rows go across.

×	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										

The numbers on the top row and left column are the two factors that you will multiply.

Find your "Multiplication Table" in the Appendix. Carefully remove it.

Demonstrate to your student how to read the numbers on the two axes. Use your finger to show the student how to find the correct box to write the answer in. Observe your student carefully as he or she fills in the boxes on the Multiplication Table. Check for accuracy and correct placement.

If necessary, the student may use a ruler or a folded piece of paper under the row to help keep track.

You will fill in one row at a time on your Multiplication Table with the answers to the multiplication of the two factors.

×	0	1	2	3	4	5	6	7	8	9
0	0	0	0							
1										
2										

$0 \times 0 = 0$
Write 0 in the box.

$0 \times 1 = 0$
Write 0 in the box.

$0 \times 2 = 0$
Write 0 in the box.

Start with the 0 row. Multiply 0 by each number in the top row. Multiply 0 by 0 first, then 0×1, 0×2, and so on. Write only the answer in each box.

When you have finished with the 0 row, move down to the row beginning with 1. Multiply each number on the top row by 1.

×	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2							
2										
3										

$1 \times 0 = 0$ $1 \times 1 = 1$ $1 \times 2 = 2$

MAKING A MULTIPLICATION TABLE

Do each row in the same way.

You may remember some of the answers, but you may have to figure out many of the others. You may find the following strategies helpful.

Encourage your student to figure out each answer on his or her own as it is more helpful to visualize and internalize the process.

- You can make an array with buttons, pennies, or other small objects. For example, if you have to figure out 6×7, you can make six rows with 7 in each row and count the total.

- You can draw the groups.

- You can use your centimetre grid paper to make arrays.
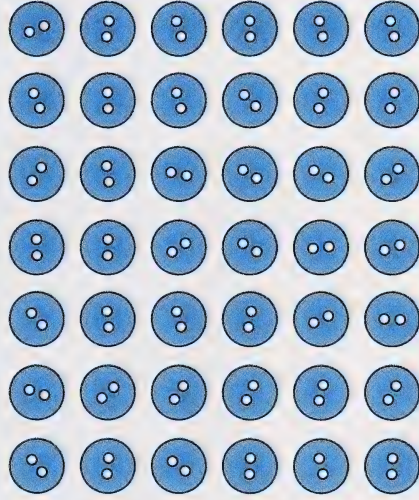
- You can count by the number being multiplied by. For example, to find the answers for the $3 \times$ row, you count by 3s. A hundred chart or a multiples of 3 chart can help you with this.

- You can do repeated addition. For example, to find out what 3×9 is, you can add $9 + 9 + 9 = 27$.

When your student has completed the table, check the answers for accuracy. A multiplication table is provided in the answer key for your convenience.

- You can use the patterns you discover as you work on the table.

When you have completed the table, you can try it out!

For example, to find 6×8, find 6 on the left column. Run your finger across the row. With a finger on your other hand, find the column with 8 at the top and run your finger down the column. The box where your fingers meet holds the answer.

You can use a ruler or a piece of folded paper to help you keep your place if you need to.

Use your multiplication table to find the answers.

×	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6									48	
9										

1. 7×7 = _____

2. 9×4 = _____

3. 6×8 = _____

4. 8×6 = _____

5. 7×9 = _____

6. 6×6 = _____

7. 7×6 = _____

8. 8×9 = _____

9. 9×6 = _____

Keep your multiplication table in your Student Folder or post it on the wall near your work area. You can use it to help you find the answers to multiplication problems.

DAY 8: REMEMBERING THE FACTS

You have worked hard to remember addition and subtraction facts. An important part of Grade Three Mathematics is to remember multiplication facts too.

Today's activities will teach you some strategies for remembering the multiplication facts to 50.

×	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	16	20	20	24	28	32	36
5	0	5			24	25	30	35	40	45
6	0	6	12		28	30	36	42	48	54
7	0	7		18	32	35	42	49	56	63
8	0	8			36	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

$4 \times 4 = ?$
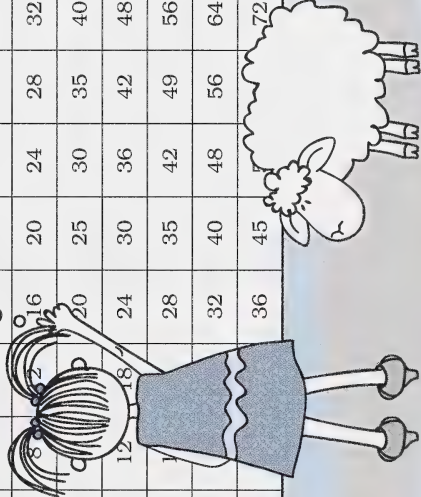
LESSON 1

Your student needs to develop strategies to help remember multiplication facts. If you have any strategies that helped you recall facts, share your experiences with your student.

By the end of Grade Three Mathematics, you should be able to remember the multiplication facts to 50. You will practise by doing timed exercises, just like you have been doing for addition and subtraction. You should be able to do 25 multiplication questions in two minutes by the end of Grade Three Mathematics. You have lots of time to master these multiplication facts, but there's no better time to start than now.

When Sarah began to learn her multiplication facts, she quickly saw that she already knew many of them.

You may be surprised at how many multiplication facts you already know!

$4 \times 0 = 0$

$0 \times 4 = 0$

$1 \times 1 = 1$

$2 \times 1 = 2$

$3 \times 1 = 3$

1. What do you know about multiplying by 0? _____

_____

2. What do you know about multiplying by 1? _____

_____

REMEMBERING THE FACTS

Multiplying by 2 is just like adding doubles.
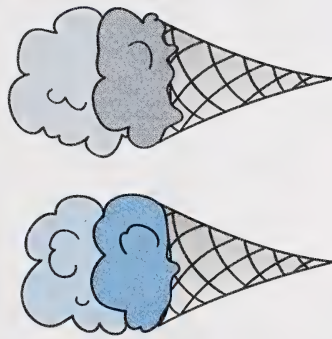
3. a. How many scoops of ice-cream in all?

$2 \times 2 = $ _____

2 × 2 is two groups of 2 or 2 + 2. I know that! It's 4!

b. How many juice boxes are there in all?

2 groups of 3 is the same as 3 + 3.

$2 \times 3 = $ _____
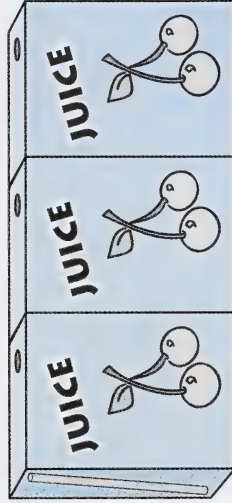
When you multiply by 2, think of the related doubles fact.

4. a. 2×4 is the same as $4+4$. $2 \times 4 =$ _____

b. 2×5 is the same as $5+5$. $2 \times 5 =$ _____

c. 2×6 is the same as $6+6$. $2 \times 6 =$ _____

d. 2×7 is the same as $7+7$. $2 \times 7 =$ _____

e. 2×8 is the same as $8+8$. $2 \times 8 =$ _____

f. 2×9 is the same as $9+9$. $2 \times 9 =$ _____

If you can remember these facts, then you also know the answer when the order of the factors is changed.

5. a. $3 \times 2 =$ _____ b. $4 \times 2 =$ _____ c. $5 \times 2 =$ _____ d. $6 \times 2 =$ _____

e. $7 \times 2 =$ _____ f. $8 \times 2 =$ _____ g. $9 \times 2 =$ _____

6. Use your new skills to do the questions below.

a. $0 \times 9 =$ _____ b. $5 \times 1 =$ _____ c. $2 \times 6 =$ _____

d. $1 \times 8 =$ _____ e. $5 \times 2 =$ _____ f. $7 \times 0 =$ _____
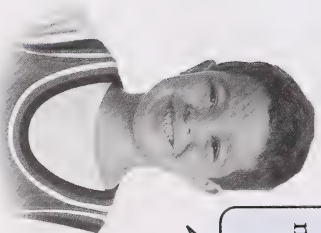
These are multiplication facts I know already!

REMEMBERING THE FACTS

LESSON 2

Multiplying by five is also easy to remember.

How many toes are there in all the feet below?

5, 10, 15, 20, 25, 30
The answer is 30.

$5 \times 6 =$ _____
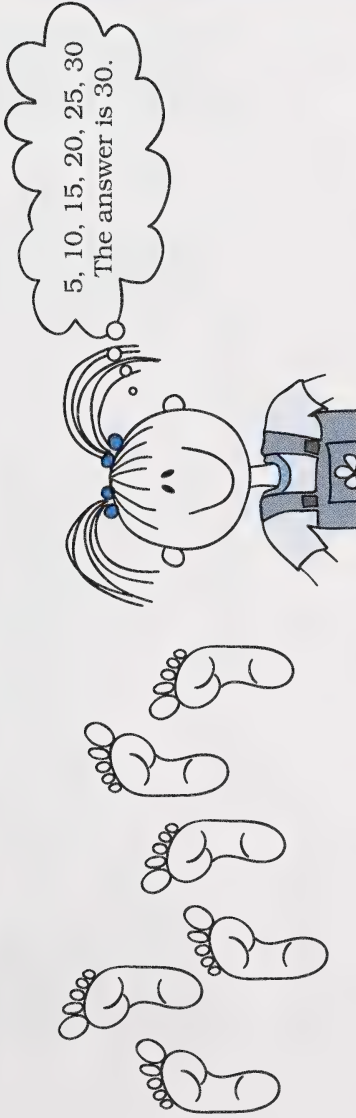
You can count by 5s to find the answer. Count by 5s six times.

1. Try counting by 5s to get each of the answers.

a. $5 \times 7 =$ _____

b. $5 \times 3 =$ _____

c. $5 \times 4 =$ _____

d. $5 \times 1 =$ _____

e. $5 \times 5 =$ _____

f. $5 \times 8 =$ _____

g. $5 \times 2 =$ _____

h. $5 \times 6 =$ _____

i. $5 \times 9 =$ _____

Show your student how to use fingers to keep track when counting by five. Each time the student says a number, a finger is raised until the target number of fingers is reached. For example, to multiply 5 × 9, the student will count by 5s (5, 10, 15, 20, 25, 30, 35, 40, 45) until the ninth finger is raised.

You can still count by 5s when the order of the factors is changed.

2. Write each answer.

a. 4 × 5 = _____   b. 6 × 5 = _____   c. 9 × 5 = _____

d. 7 × 5 = _____   e. 8 × 5 = _____   f. 3 × 5 = _____

LESSON 3

Counting by 3s can help you multiply by three.

Practise several times each day until you know how to count by 3s well.

$$3, 6, 9, 12, 15, 18, 21, 24, 27$$

If you like, you can make up little rhymes to help you remember.

3, 6, 9 – I'm doing fine.
12, 15, 18 – I know where you've been.
21, 24, 27 – I'll know it before I'm eleven.

You can count by 3s to solve multiplication sentences when one of the factors is three.

Encourage your student to practise counting by 3s several times each day. This can be done as you are doing other daily tasks such as doing chores, walking, driving, or any spare minute during the day.

Encourage the student to make his or her own rhyme to help remember.

REMEMBERING THE FACTS

To find the answer to 3×7, you can count by 3s seven times. Use your fingers to keep track if you need to.

3, 6, 9, 12, 15, 18, 21
3×7 is 21.

Over the next few lessons, your student will be introduced to more strategies to help remember multiplication facts. You may wish to prepare flash cards, play games, or have your student do extra drill exercises on paper or on the computer.

1. Write the answers.

a. $3 \times 4 =$ _____

b. $3 \times 7 =$ _____

c. $3 \times 3 =$ _____

d. $3 \times 1 =$ _____

e. $3 \times 6 =$ _____

f. $3 \times 8 =$ _____

g. $3 \times 2 =$ _____

h. $3 \times 0 =$ _____

i. $3 \times 9 =$ _____

It is best to concentrate on what the student already knows and build the facts from there. Most students learn the 0, 1, 2, 3, and 5 multiplication number facts first. Concentrate on these facts until your student recalls them easily. Then introduce the nine times table. Be sure to practise both orders of factors as they are introduced (5 x 7 and 7 x 5). After this has been accomplished, there are only ten more new facts to learn from the 4, 6, 7, and 8 times tables.

2. Use what you know about the order of the factors to find the answer.

a. $8 \times 3 =$ _____

b. $5 \times 3 =$ _____

c. $9 \times 3 =$ _____

d. $7 \times 3 =$ _____

e. $6 \times 3 =$ _____

f. $4 \times 3 =$ _____

INTERNET

For extra practice multiplying, try the following websites.

• **http://www.aaamath.com/mul.html**

This first site gives you a choice of activities such as "Multiplication and Addition" and "Multiplication Facts." You can choose the level of facts that you want to practice.

• **http://www.aplusmath.com/Games/index.html**

Choose from a variety of multiplication games at the next site.

ASSIGNMENT BOOKLET

Go to Assignment Booklet 4A.

DAY 9: PROBLEM SOLVING

You have learned that multiplying is a short way to add equal groups. Knowing how to multiply can make it easier to solve many problems.

As you work through the problem-solving steps in today's activities, you will learn about words that tell you to multiply. You will use what you have learned about multiplication to help you solve problems.

LESSON 1

You may wish to review the key words for addition and subtraction with your student. Words such as *altogether*, *in all*, *how many more*, *sum*, and *total* tell the student to add. Words that indicate subtraction are *difference*, *fewer*, *left*, and *how many more*.
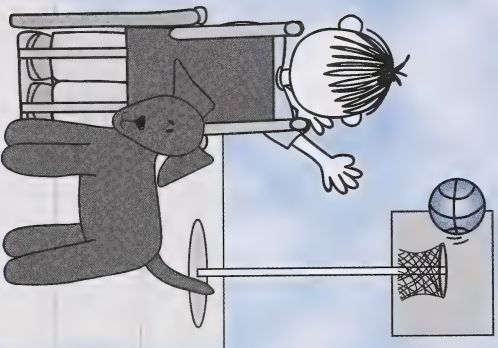
You have practised doing addition and subtraction problems. You know that to solve problems you must read carefully and look for words that tell you which operation to use.

You also know that multiplying is the same as adding groups of the same size. If the problem tells about groups of the same size, you will need to multiply.

Some of the words that tell you to add can also be a clue to multiply. Words like *how many*, *altogether*, and *in all* give you a clue that you may need to multiply. Watch for the words *factor*, *multiple*, and *product*. These words also mean you will need to multiply to find the answer.

Read the problems below. Will you need to add, subtract, or multiply to find the answer? What word or words tell you what operation to do?

1. Luke scored 14 points in one basketball game and 10 points in another game. What was the total number of points he scored?

a. You need to _____ to find the answer.

b. What word tells you to do that operation? _____

PROBLEM SOLVING

2. Luke's friend played 5 games and scored 6 points in each game. How many points did she score in all?

a. You need to _____ to find the answer.

b. What words tell you to do that operation? _____
_____

3. How many more points did Luke's friend score than Luke?

a. You need to _____ to find the answer.

b. What words tell you to do that operation? _____
_____

4. Luke's mom brought 2 cases of juice for the team to share after the game. There were 9 juice boxes in each case. How many juice boxes were there?

a. You need to _____ to find the answer.

b. What words tell you to do that operation? _____
_____
_____
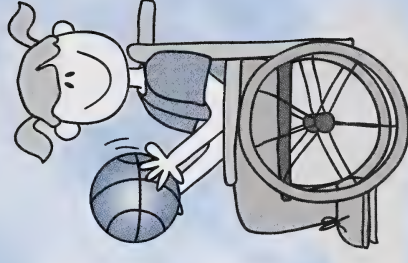
LESSON 2

Luke's cooking class prepared the exact number of snacks for the kindergarten students.

They made 6 plates of cookies with 4 cookies on each plate. They also made 3 plates of fruit with 5 pieces of fruit on each plate.

1. How many cookies in all did they make for the students?

| Understand the problem. |

a. What do you have to find out? _____

| Make a plan. |

b. Will you need to add, subtract, or multiply to find the answer? _____

c. How will you solve the problem? _____

If necessary, remind your student of the ways to figure out multiplication equations—drawing a picture, making an array, counting by the number of a factor, checking a multiplication table, or doing repeated addition.

Try the plan.

d. Solve the problem. Show your work.

e. Write a sentence to answer the question in the problem.

_____

_____

Look back.

f. Reread the problem. Does your sentence answer the question that is asked in the problem?

Does the answer make sense? _____

2. How many pieces of fruit did Luke's class prepare?
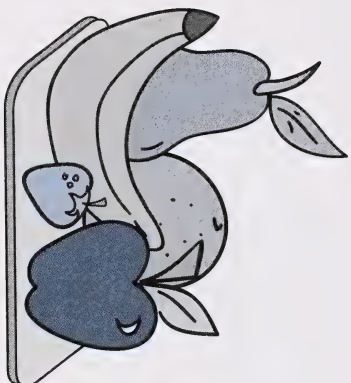
a. What do you have to find out? _____

b. Is there missing information? _____ Where can you find that information?

c. Will you need to add, subtract, or multiply to find the answer?

_____

d. How will you solve the problem? _____

_____

e. Solve the problem. Show your work.

Try the plan.

f. Write a sentence to answer the question in the problem.

_____

g. Reread the problem. Does your sentence answer the question that is asked in the problem?

_____

Does the answer make sense? _____

Look back.
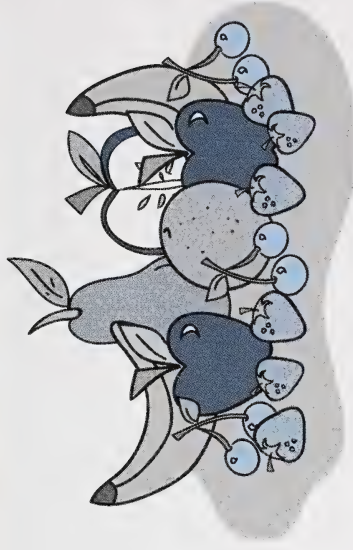
3. Each kindergarten student gets 1 item—either a cookie or a piece of fruit for a snack. How many students would get a snack?

Understand the problem.

a. What do you have to find out? _____

Make a plan.

b. Is there missing information? _____ Where can you find that information? _____

c. Will you need to add, subtract, or multiply to find the answer?

_____

d. How will you solve the problem? _____

_____

e. Solve the problem. Show your work.

Try
the
plan.

f. Write a sentence to answer the question in the problem.

_____

g. Reread the problem. Does your sentence answer the question that is asked in the problem?

_____

Does the answer make sense? _____

Look
back.

ASSIGNMENT BOOKLET

Go to Assignment Booklet 4A. When you finish the assignment for today, you will complete the Student's Checklist and fill out the Student's Comments before submitting your work to the teacher.

DAY 10: CHECKING YOUR WORK

You have learned many different ways to check your work when you add and subtract.

Today's lessons will show you how to check your answers for multiplication questions. You will also learn a trick to help you remember multiplication facts!

CHECKING YOUR WORK

LESSON 1

Can you think of some ways that you could check your answers for multiplication sentences? Tell your home instructor.

The quickest ways to check your work are to use a multiplication table or to use a calculator.

Take out your calculator.

To find the answer for 7×9, enter the following on your calculator.

Press

[7] [×] [9] [=]

1. $7 \times 9 =$ _____

2. Use your calculator to find the answers.

   a. $6 \times 8 =$ _____   b. $7 \times 7 =$ _____

   c. $9 \times 8 =$ _____   d. $6 \times 7 =$ _____

Your student may suggest multiplication tables, calculators, making an array, making an estimate, or other methods of checking answers.

To calculate $6 \times 8 =$ _____
I press [6] [×] [8] [=]
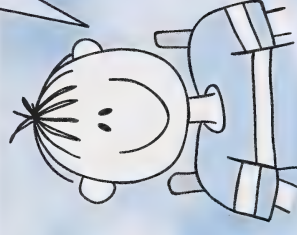
Check these answers by using your calculator or by using your multiplication table. Put a ✓ (check mark) beside the correct answers and an ✗ (ex) beside the incorrect answers.

3. a. $5 \times 8 = 35$

   b. $6 \times 7 = 42$

   c. $9 \times 8 = 68$

   d. $7 \times 9 = 63$

   e. $4 \times 8 = 34$

   f. $8 \times 8 = 72$

   g. $9 \times 6 = 54$

   h. $3 \times 9 = 28$

A calculator is handy for checking answers, but do not get into the habit of using a calculator for doing all of your multiplication questions. You must be able to **remember** the answers to multiplication questions up to 50 by the end of the year.

You can also use what you know about multiples and patterns to check your work. Like Luke and Sarah on Day 4 and Day 5, you found many patterns.

Do you remember some of the following helpful patterns?

- If 0 is a factor, the answer is always 0.
- If 1 is a factor, the answer is always the same as the other factor.
- If one or both of the factors is even, the answer is even.
- If 5 is a factor, the answer always ends in 0 or 5.
- If 10 is a factor, the answer always ends in 0.

Which patterns would help me to check multiplication questions?
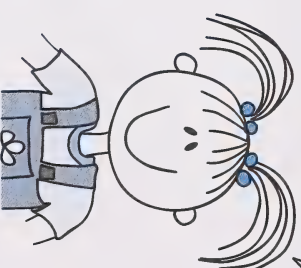
4. Make a prediction about multiplying by 8. Are the answers even, odd, or both?

_____

_____

_____

Check your multiplication table. Was your prediction correct? _____

5. Use what you know about patterns to check these answers. Put a ✓ (check mark) beside the correct answers and an ✗ (ex) beside the incorrect answers. Tell how you know.

a. $6 \times 4 = 31$ I know because _____

b. $5 \times 9 = 46$ I know because _____

c. $10 \times 4 = 40$ I know because _____

d. $2 \times 9 = 19$ I know because _____

e. $8 \times 8 = 63$ I know because _____

You can also use what you know about estimation to check your answers. Use the multiplication facts you know to help you estimate.

I wrote $4 \times 6 = 34$, but I'm not sure if it's right. I know $5 \times 6 = 30$, so 4×6 must be less than 30. My answer is not correct, so I better try that one again.

LESSON 2

Try this finger trick if you are having trouble remembering multiplication sentences with 9 as a factor.

Hold your hands in front of you.

Bend down the finger that represents the other factor. For example, for 9×8, bend down your 8th finger.

You will notice that you have **7** fingers to the left of the bent finger and **2** to the right of the bent finger. The answer is **72**.

Therefore, the answer to $9 \times 8 = 72$.

1st 2nd 3rd 4th 5th

6th 7th 8th 9th 10th

CHECKING YOUR WORK
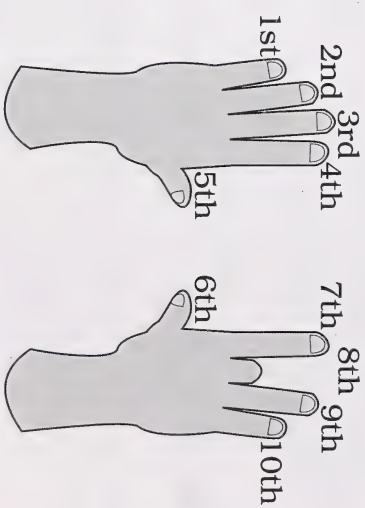
Try another one.

$9 \times 6 = ?$

Use the finger trick to find the answers.
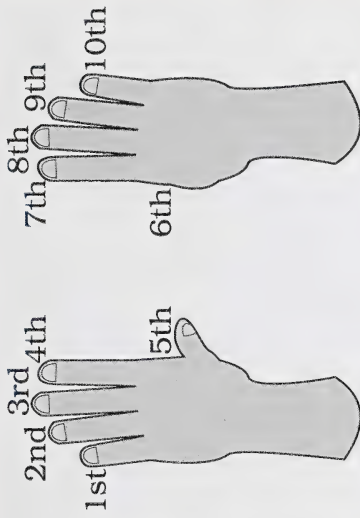
Bend down your 6th finger.

1. There are _____ fingers to the left and _____ fingers to the right.

   The answer is _____.

2. Try these questions using the finger trick.

   a. $9 \times 9 =$ _____   b. $9 \times 7 =$ _____

   c. $5 \times 9 =$ _____   d. $9 \times 3 =$ _____

   e. $9 \times 4 =$ _____   f. $8 \times 9 =$ _____

Hey! This is a great trick.

INTERNET
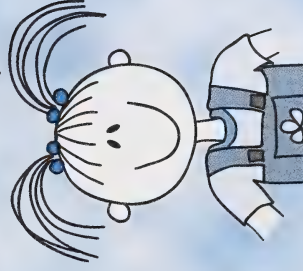
For extra practise learning the multiplication facts, try the following websites:

- **www.dositey.com/math34.html**

  This website has a variety of free games and printable worksheets. Look under *Multiplication* for a variety of activities dealing with multiplication.

- **www.mathmastery.com**

  At this website, choose *Cyber Challenge*. Then choose *Magnificent Multiplication*.

ASSIGNMENT BOOKLET

Go to Assignment Booklet 4B.

DAY 11: ONE MORE STRATEGY

You will work with arrays in today's activities.
Breaking down arrays into smaller parts can
help you remember or figure out multiplication
problems.

You might be surprised!

Working with arrays allows the student to visualize how multiplication facts can be simplified.

It is important that the student learns the 1, 2, 3, and 5 times tables well. Breaking larger facts down into two smaller ones gives students an additional way to find answers mentally to difficult facts. Some students do this naturally when they go back to the nearest fact they remember and then count on. For example, when students need to figure out 6 × 6, they remember that 5 × 6 = 30, and add 6 more to get 36. When they can do this, they soon realize that 6 × 7 is the same as 6 × 5 + 6 × 2. Then the student can add 30 + 12 mentally.

LESSON 1

You have learned tricks to help you remember many multiplication facts. Some facts are easy to remember because you know the patterns well.

In this activity, you will work with the arrays of some of the more difficult multiplication facts. You will see how breaking apart a difficult multiplication fact can help you remember it.

Find "Array Cards" in the Appendix. Cut out each card.

Find the card that shows 4 × 6.

4 × 6 = _____

What happens if you cut the card apart?
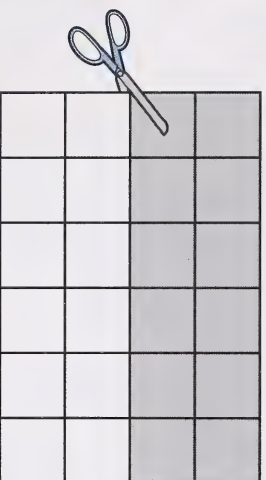
Cut the shaded area apart from the unshaded area.

Now you have two smaller arrays.
2 × 6 = 12 and 2 × 6 = 12.

ONE MORE STRATEGY

You can write it, like

$$2 \times 6 = 12$$
$$+ \ 2 \times 6 = 12$$
$$\overline{ \ 4 \times 6 = 24}$$

> I never thought of it that way. That makes it much easier!
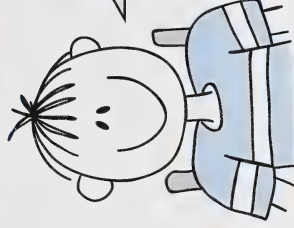
You can see that 4×6 is the same as $2 \times 6 + 2 \times 6$.

If you know your facts for the 2 times table well, this can help you remember or figure out 4×6.

You could also break apart the 4×6 array like this:

You would have 1×6 and 3×6.

$$1 \times 6 = \ \ 6$$
$$+ \ 3 \times 6 = 18$$
$$\overline{ \ 4 \times 6 = 24}$$

Find the card that shows 4×7.

Cut apart the shaded area to make two smaller arrays.

2. Write the two arrays you made. _____

_____ + _____

Add the arrays: _____

Find the card that shows 4×8.

Cut the shaded area apart to make two smaller arrays.

3. Write the two arrays you made.

Add the arrays:

_____ + _____

Find the card that shows 4×9.
Cut the shaded area apart to make two smaller arrays.

4. Write the two arrays you made.

Add the arrays:

_____ + _____

Find the array that shows 6×6.

Think of a way to break it apart that would help you remember it.

Wow! There are so many ways to get the same answer!

Hint:

When working with the arrays, encourage the student to use the facts that have already been mastered. The student can use the familiar facts to learn the unfamiliar ones.

If you know 5×6 well, then you may want to make 5×6 and 1×6.
If you know 2×6 well, then you may want to make 2×6 and 4×6.
If you know 3×6 well, then you may want to make 3×6 and 3×6.

5. Write the two arrays you made.

_____   +   _____

Add the arrays: _____

Find the array that shows 6×7.

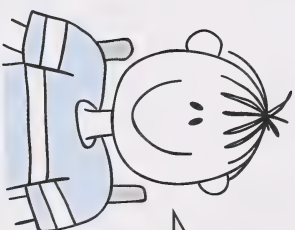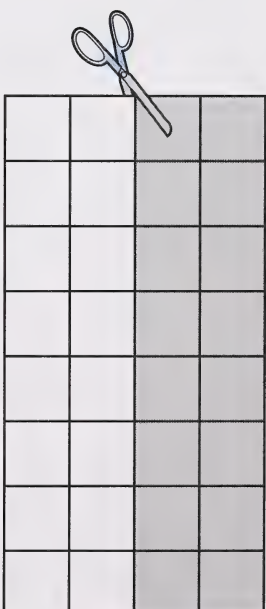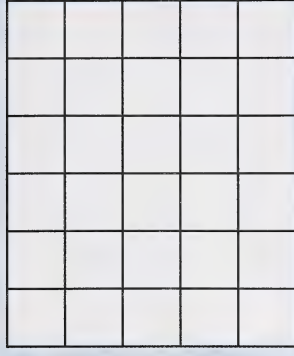Think of a way to break it apart that would help you remember it.

6. Write the two arrays you made.

_____   +   _____

Add the arrays: _____

Save your other "Array Cards." You will need them when you work in your Assignment Booklet.

LESSON 2

You have learned many ways to figure out and remember multiplication facts. It is important that you are able to do multiplication facts quickly. You will use these facts often as you go through school.

When you can remember the facts for the 1, 2, 3, 5, and 9 times tables, there are really only ten more facts to learn. Remember, if you know 5×8 then you also know 8×5. Always use what you already know to help you learn the other facts.

Practise the 1, 2, 3, 5, and 9 times tables until you know them very well. When you feel you have mastered them, you will be ready to learn the last 10 facts of multiplication.

You will make some flash cards today for these facts.

Find "Flash Cards" in the Appendix. Cut them out.

Write the answer on the back of each card. You may use any strategy you like to find the answers. Ask your home instructor to check the answers for you. Now you're set to practise!

Go to the Assignment Booklet 4B.

Make sure your student has mastered all the facts for the 1, 2, 3, 5, and 9 times tables before going on. When your student is ready, spend time practising these last 10 facts. Flash-card work made into a game is much more enjoyable for the student.

Check the student's cards to be sure that the answers are accurate. Do not allow the student to practise incorrect flash cards.

4×4

42

$7 \times 8 =$

DAY 12: SHARING

Have you ever had to share cookies, candies, or other treats with friends? How did you divide the treats into equal groups?

Are you ready to explore dividing groups?

LESSON 1

Can you think of a time you had several items and shared them equally among friends or family members? Tell your home instructor.

When you did that, you were using the math operation of **division**. Division is making equal groups. It is the opposite operation of multiplication.

Find "Cookies" in the Appendix. Remove the page carefully, and cut on the lines.

Use **all** the cookies to act out the stories that follow. Make sure each person gets an equal share.

Your student may have shared treats or toys with a group of people. You may also discuss times that you have had to be sure that everyone got a *fair share* of an item in your family. Your student may also recall making "fair shares" in fractions, working with parts of a whole.

SHARING

1. a. There are 2 children. How many cookies will each child get?

   _____

   b. There are 4 children. How many cookies will each child get?

   _____

   c. There are 5 children. How many cookies will each child get?

   _____

   d. There are 10 children. How many cookies will each child get?

   _____

Now you can act out more stories. Use as many cookies as the following stories require.
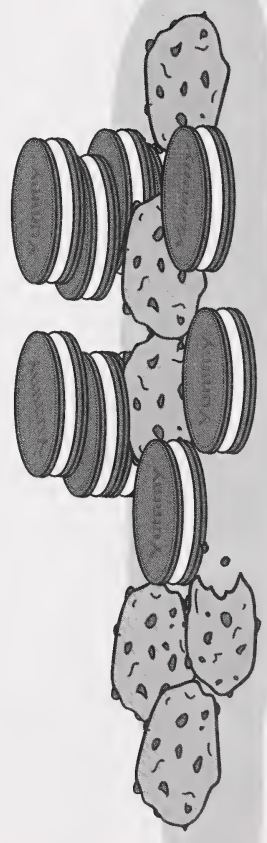
2 a. There are 12 cookies. Divide them equally among 3 children.

How many cookies will each child get? _____

b. There are 15 cookies. Share them among 5 children.

How many cookies will each child get? _____

c. There are 10 cookies and 2 children.

How many cookies will each child get if they are shared equally?

_____

STUDENT FOLDER
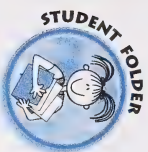
Save your cookies to use when you do the Assignment Booklet activities.

LESSON 2

In lesson 1, you used cookie cutouts to find the answers. You can use other small items to act out story problems, too.

MATH BOX
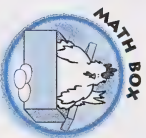
Take out your buttons.
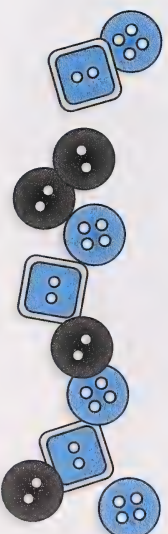
Any small manipulatives may be used instead of buttons.

SHARING

Use some buttons to act out the stories that follow.

1. At a pet store there are 4 dogs. There are 8 dog biscuits. If the biscuits are shared equally, how many will each dog get? _____

2. There are 12 sesame sticks and 3 parrots. How many sesame sticks can each parrot have? _____

3. The 4 goldfish get 16 shrimp to eat. If the shrimp are divided equally, how many will each fish get? _____

Let the student find a way to divide the pictures into groups. Some students may draw lines or circles to show groups. Some trial and error may be necessary to make the groups equal.

You can also use pictures to help you divide groups.

4. There are 14 doughnuts divided among 7 people.

Each person gets _____ doughnuts.

5. There are 15 candies divided into 5 packages.
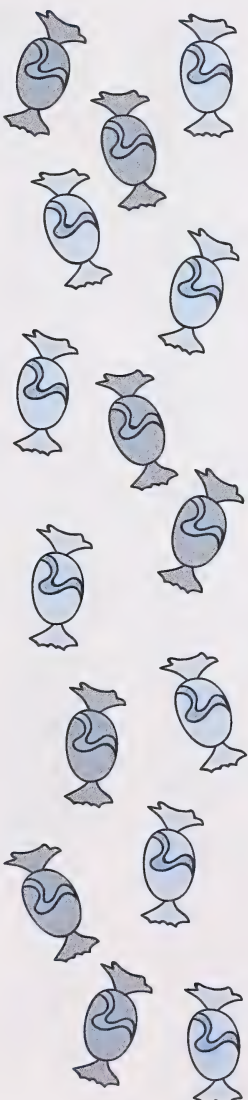
There will be _____ candies in each package.

6. Divide 8 toy cars into 2 groups.
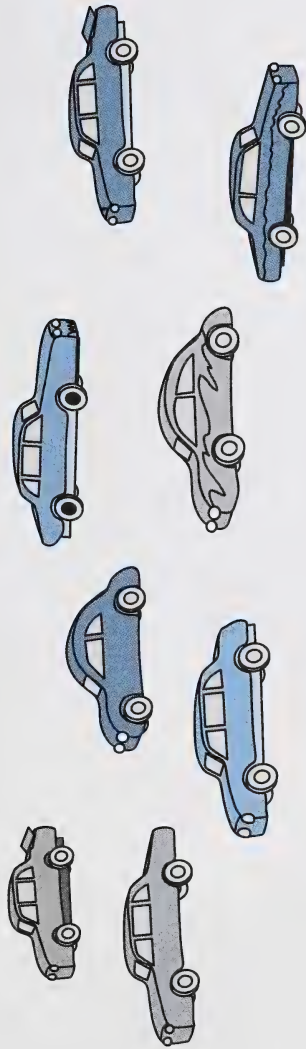
How many cars are in each group? _____

EXTENSION ACTIVITY

For fun or extra practice, you and your home instructor could bake a batch of your favourite cookies. Set out a number of plates, and divide the cookies into equal groups. Write down the different groups that you can make.

For example, if you make 24 cookies, how can they be divided equally? Can you divide them equally on 2 plates? 3 plates? 4 plates? 5 plates? Can you share the cookies fairly with the members in you family or will there be some left over?

What did you discover? What was the best part of this activity?

ASSIGNMENT BOOKLET

Go to Assignment Booklet 4B.

DAY 13: USING ARRAYS

You learned that arranging items in arrays can make it easier to multiply.

Today, you will find out how arrays can help you divide too.

You will also learn how multiplying and dividing are related as you work through the activities.

USING ARRAYS

LESSON 1

When you worked on multiplication problems, you discovered that putting objects into rows and columns made them easier to count. Arrays make division problems easier too.

MATH BOX

Take out your pennies.

Count out 18 pennies. Make an array. Put 6 pennies in each row.

1. How many rows will you need? _____

Count out 24 pennies. Make an array. Put 4 pennies in each row.

2. How many rows will you need? _____

Count out 15 pennies. Make 3 rows.

3. How many pennies are in each row? _____

Finding how many pennies in a row or how many rows you need is just like sharing or dividing into groups. Putting the groups in rows and columns just makes it easier to count.

Any small manipulatives may be substituted for pennies.

If your student is unsure how to do this, model a few examples. Show the student how to share the pennies out evenly in rows and columns.

Make arrays to find the answer.

4. Divide 21 pennies into 3 rows. How many pennies are in each row? _____

_____

5. Show 12 pennies with 6 in each row. How many rows are needed? _____

_____

6. Show 16 pennies divided into 4 rows. How many pennies are in each row? _____

_____

You probably noticed that the arrays you made when you divided are much like the ones you made when you multiplied. When you divide, you start with the total number and divide it into groups. When you multiply, you start with the groups and find out the total.

7. Multiplying and dividing are related. How can knowing the multiplication array or fact help you divide?

_____

_____

_____

LESSON 1

You already know that number sentences are another way of telling about math operations. Do you remember the following ways?

You know that

6 plus 3 is 9   or $6 + 3 = 9$ or

$$\begin{array}{r} 3 \\ + 6 \\ \hline 9 \end{array}$$

7 take away 5 is 2   or $7 - 5 = 2$ or

$$\begin{array}{r} 7 \\ - 5 \\ \hline 2 \end{array}$$

3 groups of 4 is 12   or $3 \times 4 = 12$ or

$$\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$$

15 divided by 3 is 5 and can be written as $15 \div 3 = 5$ or $3\overline{)15}^{\,5}$

Division can also be shown as a number sentence.
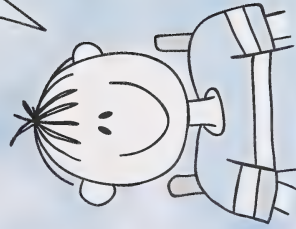
DAY 14: WRITING DIVISION NUMBER SENTENCES

You know how to write and solve number sentences about addition, subtraction, and multiplication.

In today's activities, you will learn how to write number sentences about dividing or sharing.

TIMED EXERCISE: 2 MINUTES

$9 + 4 =$ _____ $7 + 8 =$ _____ $4 + 3 =$ _____ $6 + 6 =$ _____ $7 + 4 =$ _____ $4 + 6 =$ _____

$9 + 5 =$ _____ $9 + 7 =$ _____ $5 + 6 =$ _____ $4 + 4 =$ _____ $9 + 8 =$ _____ $7 + 2 =$ _____

$3 + 9 =$ _____ $3 + 5 =$ _____ $2 + 9 =$ _____ $8 + 8 =$ _____ $7 + 3 =$ _____ $4 + 8 =$ _____

$$\begin{array}{r} 8 \\ +4 \\ \hline \end{array}$$
$$\begin{array}{r} 6 \\ +3 \\ \hline \end{array}$$
$$\begin{array}{r} 9 \\ +1 \\ \hline \end{array}$$
$$\begin{array}{r} 5 \\ +5 \\ \hline \end{array}$$
$$\begin{array}{r} 3 \\ +6 \\ \hline \end{array}$$
$$\begin{array}{r} 7 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +2 \\ \hline \end{array}$$
$$\begin{array}{r} 7 \\ +6 \\ \hline \end{array}$$
$$\begin{array}{r} 5 \\ +7 \\ \hline \end{array}$$
$$\begin{array}{r} 8 \\ +5 \\ \hline \end{array}$$
$$\begin{array}{r} 3 \\ +7 \\ \hline \end{array}$$
$$\begin{array}{r} 6 \\ +8 \\ \hline \end{array}$$

Number completed	
Number correct	

LESSON 2

Look at each array. Then answer the questions that follow.

1.

2.

There are 15 squares divided into 3 rows.

a. How many squares are in each row?

b. What multiplication fact could help you?

_____

There are 8 squares divided into 4 rows.

a. How many squares are in each row?

b. What multiplication fact could help you?

_____

Arrays help with division too!

Are you ready for your timed exercise? Ask your home instructor to time you for 2 minutes and then to mark your answers. Remember to record your scores here and on the Math Facts Graph from the Appendix.

LESSON 2

Sometimes, when you try to divide something into equal groups, the groups don't always work out evenly.

$18 \div 4 = ?$

Count out 18 of your interlocking cubes. Try to divide the cubes into 4 equal groups.

1. What do you notice? _____

When you are dividing, there may be some left over after you make equal groups.

You made 4 groups of 4, but you had 2 left over.
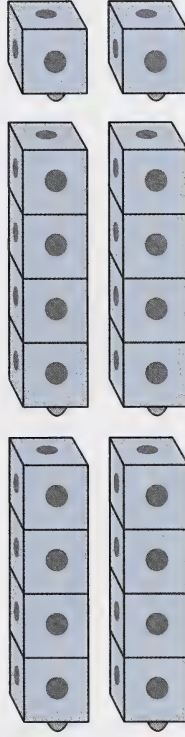
The cubes that wouldn't fit into the equal groups are called a **remainder**. A remainder is the number that is left over after dividing into equal groups.

When there is a remainder you write the number sentence like this.

$18 \div 4 = 4 \text{ R}2$ or $4 \overline{)18}$ with quotient $4 \text{ R}2$ That means that there are 4 groups of 4 and 2 remainder.

WRITING DIVISION NUMBER SENTENCES

MATH BOX
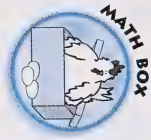
Take out your interlocking cubes.

Use your cubes to act out each story. Then write a division equation and solve it.

4. There are 25 gum balls in 5 bags. How many gumballs are in each bag?

_____

5. There are 16 gumdrops for 4 children. How many does each child get?

_____

6. There are 4 rows with 20 desks in all. How many are in each row?

_____
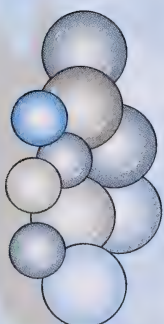
If your student is still having difficulty writing number sentences, model some additional division situations and have the student write an equation for each. Continue until your student is confident about writing equations.

2. There are 30 cookies with 5 cookies in each row. How many rows are there?

_____ ÷ _____ = _____

3. There are 21 cookies in 3 boxes. How many cookies are in each box?

_____

WRITING DIVISION NUMBER SENTENCES

If you and your student created a math vocabulary poster, you may wish to add these words and diagrams to it.
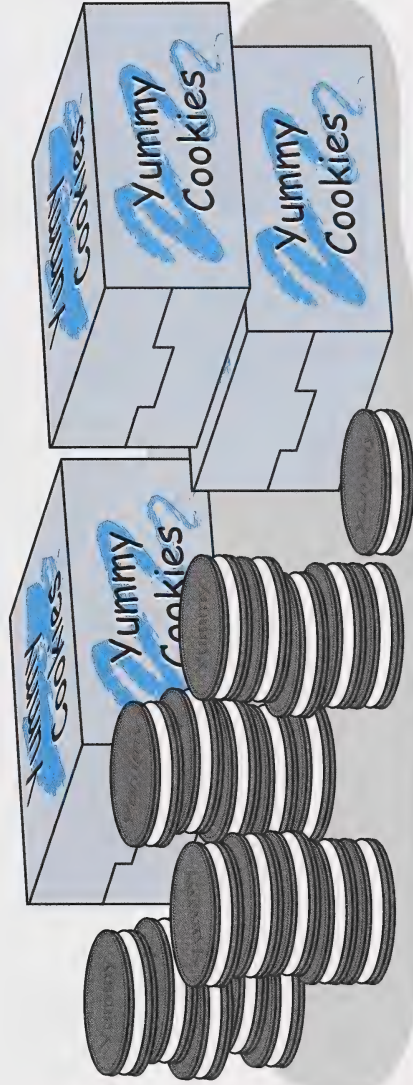
The numbers have special names in a division number sentence.

15 ÷ 3 = 5

dividend → 15

divisor → 3

quotient → 5

$$3 \overline{)15}$$

divisor → 3

quotient → 5

dividend → 15

The dividend is the number being divided. The divisor is the number that divides the dividend. The quotient is the answer in a division problem.

Now it's your turn to write some number sentences about dividing. Remember the symbol that represents dividing is ÷ or ⌐ .

1.
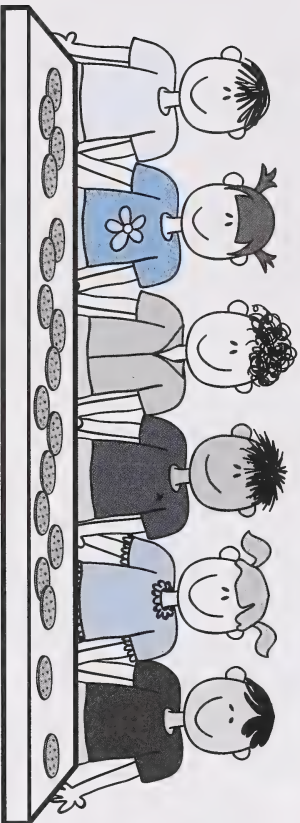
There are 18 cookies for 6 children. How many cookies does each child get?

_____ ÷ _____ = _____

WRITING DIVISION NUMBER SENTENCES

Use your cubes to act out these stories. Make equal groups. Write the number sentence. Be careful—some have remainders!

2. There are 13 kittens with 6 bowls of milk. How many kittens are at each bowl? _____

3. There are 3 feed troughs to feed 15 pigs. How many pigs are at each trough? _____

4. There are 38 hay bales in 6 rows. How many are in each row? _____

Go to Assignment Booklet 4B.
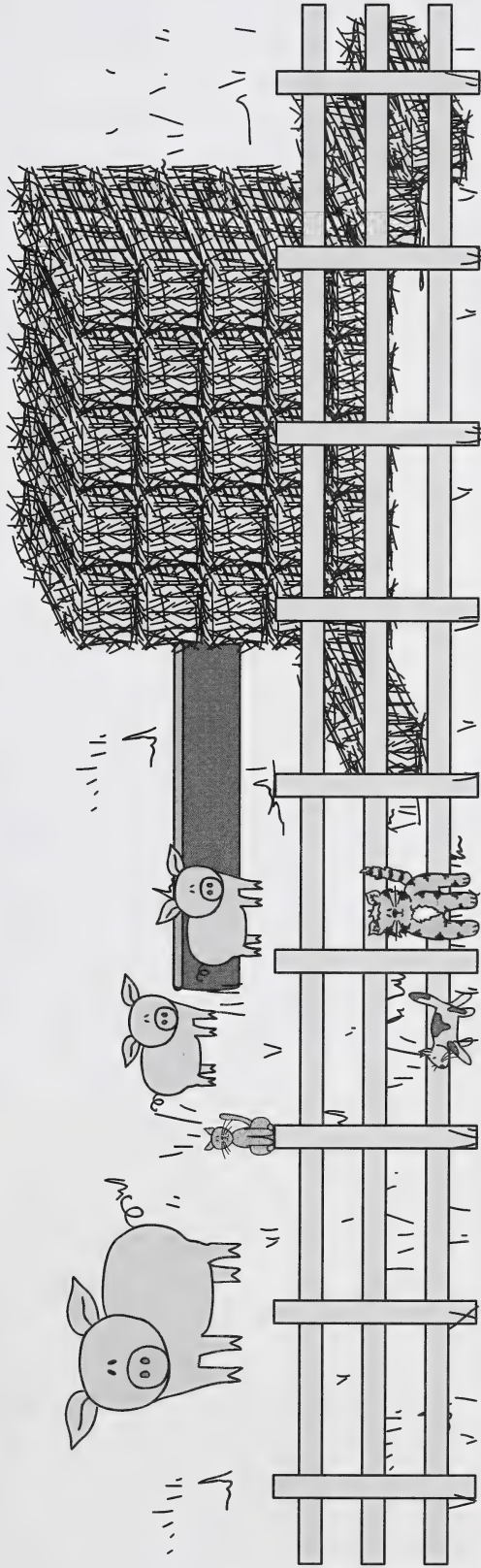
ASSIGNMENT BOOKLET

DAY 15: MULTIPLICATION AND DIVISION FACT FAMILIES

You know how to use counters and arrays to help you solve division problems. In today's lesson, you will learn how to use multiplication and division fact families to help you find answers to division number sentences.

$$2 \times 3 = 6$$

$$3 \times 2 = 6$$

$$6 \div 2 = 3$$

$$6 \div 3 = 2$$

MULTIPLICATION AND DIVISION FACT FAMILIES

LESSON 1

You have learned how addition and subtraction are related. You worked with addition and subtraction **families** to help you remember subtraction facts.

If necessary, review Day 7 of Module 1 to help your student recall how addition and subtraction facts are related.

An addition and subtraction family is made up of two addition equations with the addends in different order. It also has two related subtraction sentences.

$$8 + 7 = 15 \qquad 15 - 8 = 7$$
$$7 + 8 = 15 \qquad 15 - 7 = 8$$

If you can remember one fact, then it makes it easy to remember the three other facts because the same three numbers are used.

Multiplication and division facts are related in much the same way.

Look at these facts.

$$3 \times 4 = 12 \qquad 12 \div 3 = 4$$
$$4 \times 3 = 12 \qquad 12 \div 4 = 3$$

Allow the student to express the relationships. Your student should know that changing the order of the factors does not change the answer. Most students will mention that the same three numbers are used in all of the equations. The student may also realize that division is the inverse or opposite of multiplication and that when the total number is divided into groups, the same factors appear.

Tell your home instructor how they are related.

When you multiply, you find a total for a number of groups. Multiplying is like repeated addition.

Number of groups × number in the groups = total

6 × 3 = 18

Switching the factors around doesn't change the total.

Number of groups × number in the groups = total

3 × 6 = 18

When you work with division facts, the total comes first. Then you find how many groups there are or how many there are in each group. Division is like repeated subtraction.

Total ÷ number of groups = number in each group

18 ÷ 3 = 6

Total ÷ number of groups = number in each group

18 ÷ 6 = 3
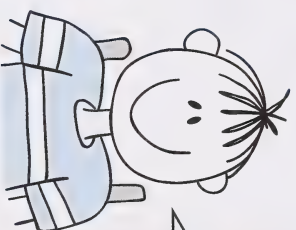
Division is the inverse or opposite operation of multiplication.

MULTIPLICATION AND DIVISION FACT FAMILIES

The related facts together are called a **fact family**. A **fact family** is made up of the four number sentences that show how three numbers are related. The same three numbers are used in different combinations.
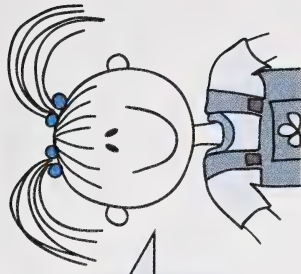
> If you remember one fact, you can find the answer to the related facts easily.

Multiplication facts

Division facts

Example:

$3 \times 9 = 27$ $9 \times 3 = 27$ $27 \div 9 = 3$ $27 \div 3 = 9$

Write the division facts that are related to these multiplication facts.

1. $5 \times 3 = 15$ $3 \times 5 = 15$ _____   _____

2. $7 \times 6 = 42$ $6 \times 7 = 42$ _____   _____

3. $4 \times 8 = 32$ $8 \times 4 = 32$ _____   _____

4. $7 \times 2 = 14$ $2 \times 7 = 14$ _____   _____

5. $8 \times 5 = 40$ $5 \times 8 = 40$ _____   _____

LESSON 2

When you see a division question, think about the related multiplication facts to help you remember the answer.

$45 \div 5 = ?$

I can think about the related multiplication fact to find the answer.
I think $5 \times ? = 45$. I know that $5 \times 9 = 45$.
The answer to $45 \div 5$ is 9.

1. Find the answers to the multiplication and division questions to complete these fact families.

a. $2 \times 8 =$ _____ $8 \times 2 =$ _____ $16 \div 8 =$ _____ $16 \div 2 =$ _____

b. $4 \times 5 =$ _____ $5 \times 4 =$ _____ $20 \div 5 =$ _____ $20 \div 4 =$ _____

c. $7 \times 3 =$ _____ $3 \times 7 =$ _____ $21 \div 3 =$ _____ $21 \div 7 =$ _____

d. $6 \times 9 =$ _____ $9 \times 6 =$ _____ $54 \div 6 =$ _____ $54 \div 9 =$ _____

e. $8 \times 4 =$ _____ $4 \times 8 =$ _____ $32 \div 8 =$ _____ $32 \div 4 =$ _____

2. Solve these division questions by thinking about the related multiplication fact.

To solve $20 \div 5$, think $5 \times ? = 20$.

a. $20 \div 5 =$ _____   b. $12 \div 2 =$ _____

c. $15 \div 3 =$ _____   d. $16 \div 4 =$ _____

e. $18 \div 2 =$ _____   f. $24 \div 3 =$ _____

Go to Assignment Booklet 4B.

ASSIGNMENT BOOKLET
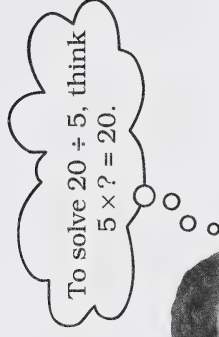
DAY 16: DIVISION STRATEGIES

Can you think of some different ways to solve division number sentences?

You know how to use counters and pictures to solve division problems. You learned about arrays and fact families, too.

As you work through this lesson, you will find out how to use a multiplication table to help you do division problems. You will also use your favourite strategies to solve division number sentences.

LESSON 1

How can you find an answer to a division number sentence?

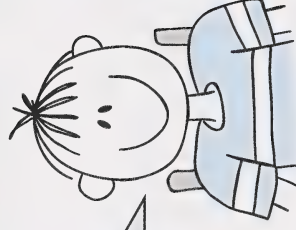1. Write three ways you can solve division equations.
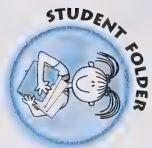
a. _____

b. _____

c. _____

On Day 15, we looked at how multiplication and division are related and how multiplication facts can help you to solve division questions.
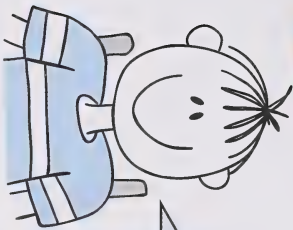
What can you do if you don't remember the related multiplication fact?

You can use your multiplication table to help you solve division number sentences.

Take out the multiplication table you made on Day 7 of this module.

> I want to know the answer to 48 ÷ 6, but I can't remember what number multiplied by 6 equals 48.

Luke will help you to use the multiplication table.

- Find 6 in the left column.

- Run your finger across the row beginning with 6 until you come to 48.

- Follow the column up to the number in the top row. You can use a ruler or a piece of folded paper to help you keep your place if you need to.

The answer to 48 ÷ 6 is 8.

The answer is 8.

×	0	1	2	3	4	5	6	7	8
0									
1									
2									
3									
4									
5									
6									48
7									
8									
9									
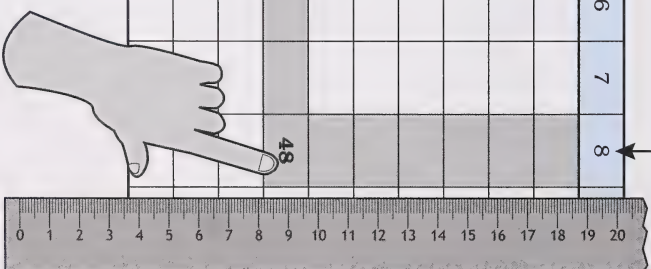
Use your multiplication table to help you find the answers to the questions below. Remember, find the divisor in the left column and go across until you find the dividend. Follow the column up to find the quotient.

Assist your student with the first few examples if necessary. Model how to find the answer by running your finger from the divisor across to the dividend, and then up to the quotient. If difficulty is encountered, encourage the student to use a ruler or folded paper to find the correct row and column.

2. a. $49 \div 7 =$ _____

   b. $54 \div 6 =$ _____

   c. $36 \div 4 =$ _____

   d. $27 \div 9 =$ _____

   e. $28 \div 4 =$ _____

   f. $40 \div 8 =$ _____

   g. $56 \div 7 =$ _____

   h. $32 \div 8 =$ _____

LESSON 2

1. Look at some of the following favourite strategies used to solve problems. Choose a strategy you like for each of the following questions. Write the strategy and complete the number sentence.

   • drawing a picture
   • using counters
   • using an array
   • remembering the related multiplication fact
   • using the multiplication table

Problem	Strategy
1. 12 ÷ 3 = _____	
2. 48 ÷ 6 = _____	
3. 45 ÷ 5 = _____	
4. 10 ÷ 2 = _____	
5. 28 ÷ 7 = _____	

Are you ready for your timed exercise? Ask your home instructor to time you for 2 minutes and then to mark your answers. Remember to record the scores here and on the Math Facts Graph from the Appendix.

TIMED EXERCISE: 2 MINUTES

$12 - 6 =$ _____ $11 - 4 =$ _____ $15 - 7 =$ _____ $14 - 5 =$ _____ $17 - 9 =$ _____ $10 - 8 =$ _____

$13 - 8 =$ _____ $15 - 6 =$ _____ $16 - 8 =$ _____ $11 - 6 =$ _____ $14 - 6 =$ _____ $12 - 5 =$ _____

$16 - 7 =$ _____ $13 - 6 =$ _____ $14 - 7 =$ _____ $12 - 8 =$ _____ $11 - 7 =$ _____ $12 - 7 =$ _____

$$\begin{array}{r} 16 \\ -7 \\ \hline \end{array} \qquad \begin{array}{r} 12 \\ -9 \\ \hline \end{array} \qquad \begin{array}{r} 10 \\ -4 \\ \hline \end{array} \qquad \begin{array}{r} 14 \\ -8 \\ \hline \end{array} \qquad \begin{array}{r} 11 \\ -5 \\ \hline \end{array} \qquad \begin{array}{r} 9 \\ -2 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ -6 \\ \hline \end{array} \qquad \begin{array}{r} 15 \\ -8 \\ \hline \end{array} \qquad \begin{array}{r} 17 \\ -7 \\ \hline \end{array} \qquad \begin{array}{r} 12 \\ -4 \\ \hline \end{array} \qquad \begin{array}{r} 18 \\ -8 \\ \hline \end{array} \qquad \begin{array}{r} 10 \\ -7 \\ \hline \end{array}$$

Number completed	
Number correct	

INTERNET

For extra practice with division problems, try some of the websites listed for multiplication. Many of these sites contain division activities as well as multiplication.

Here are two more websites with division activities.

- **http://quia.com/jg/5524.html**
- **http://www.ricksmath.com**

ASSIGNMENT BOOKLET

Go to Assignment Booklet 4B.

DAY 17: PROBLEM SOLVING

You have practised adding, subtracting, or multiplying to find an answer to a problem. In today's problems, you will work with division.

You will learn about words that tell you to divide in a problem. You will also practise doing problems with two steps.

In problems with two steps, you may have to use a different operation in each step. That's a challenge!

LESSON 1

You already know that division is related to multiplication. You also know that division and multiplication problems deal with equal groups. Any time a problem talks about equal-sized groups, you know that it may be a clue to multiply or divide.

In multiplication, you find a total for a number of equal groups. In division, you start with a total and divide it into smaller equal groups. Watch for words like *divide* or *share*. Watch for questions like *how many groups? how many rows?* or *how many in each row?* These words all give you more clues that you will need to divide. Words like *quotient, remainder,* and *separate* can also tell you to divide.

Read the following words and then the story problems that follow. Write the word on the line that tells what operation you need to use to solve each problem?
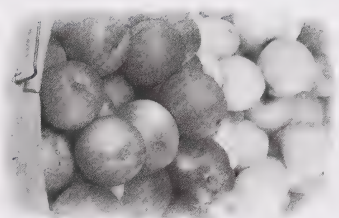
add   subtract   multiply   divide

1. There are 15 apples and 5 children. How many apples will each child get if they are shared equally?

I need to _____ to solve the problem.

2. There are 12 apples. Sarah eats 3. How many apples are left?

I need to _____ to solve the problem.

3. There are 3 bags with 5 apples in each bag. How many apples are there in all?
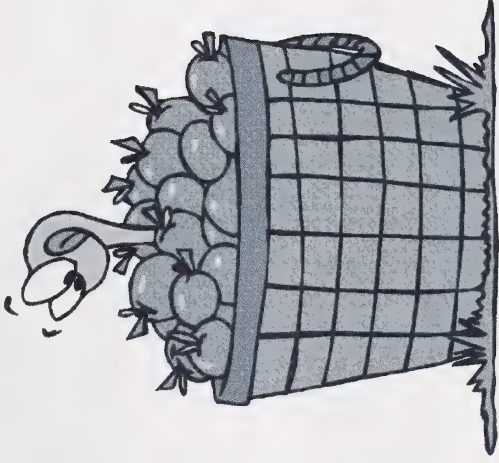
I need to _____ to solve the problem.

4. There are 18 apples and 6 baskets. If the apples are divided evenly into the baskets, how many apples will there be in each basket?

I need to _____ to solve the problem.

5. There are 12 apples in one bowl and 8 apples in another bowl. How many apples are there altogether?

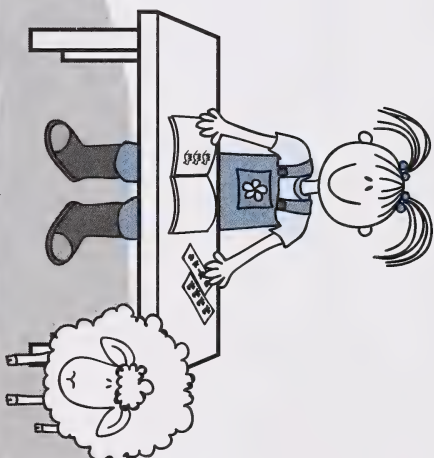I need to _____ to solve the problem.

LESSON 2

Follow the problem-solving steps to solve each problem.

1. Sarah has a sticker collection. She decided to make a sticker book to display her collection.

   She decided to put 12 dog stickers on the first page. She wanted to make an array with 3 rows. How many stickers should she put in each row?

a. What do you have to find out? _____

b. Will you need to add, subtract, multiply, or divide to find the answer?

If necessary, remind your student of the ways to figure out division equations—drawing a picture, using counters, making an array, remembering a related multiplication fact, or checking a multiplication table.

c. How will you solve the problem? _____

_____

Try the plan.

d. Solve the problem. Show your work.

e. Write a sentence to answer the question in the problem.

_____

_____

Look back.

Reread the problem. Be sure that the question is answered and that the answer is reasonable.

2. In her sticker book Sarah drew
5 corrals. She had 25 horse
stickers, and she wanted to put
equal groups into each corral.
How many horse stickers
should go in each corral?
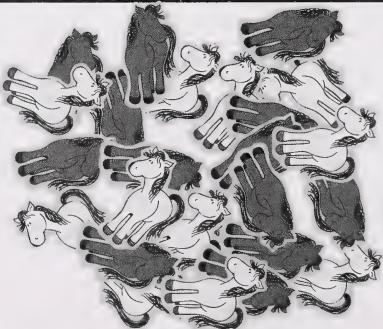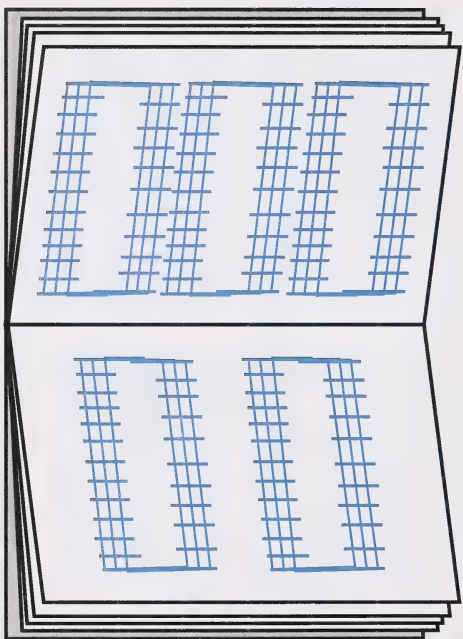
Understand the problem.

a. What do you have to find out? _____

Make a plan.

b. Will you need to add, subtract, multiply, or divide to find the answer?

_____

c. How will you solve the problem? _____

_____

Try the plan.

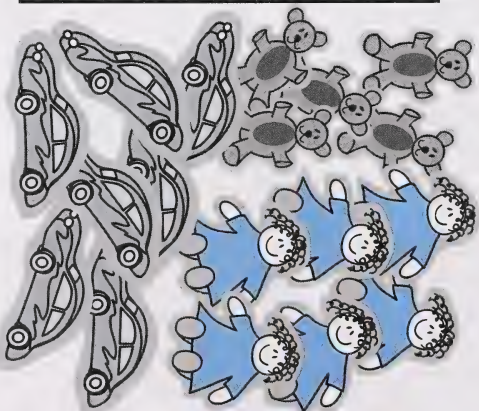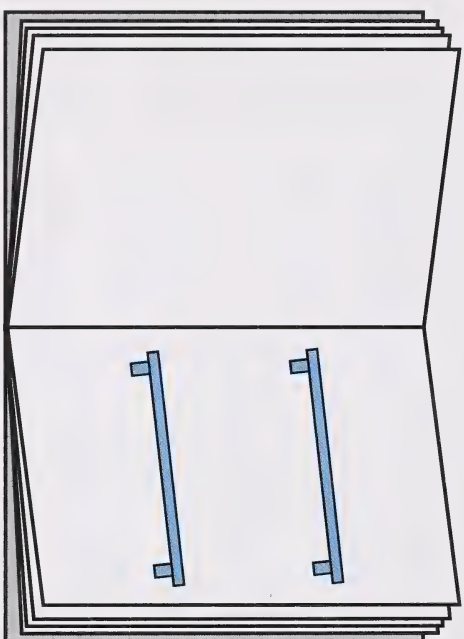d. Solve the problem. Show your work.

e. Write a sentence to answer the question in the problem.

_____

_____

Look back.

Reread the problem. Be sure that the question is answered and that the answer is reasonable.

3. Sarah had 5 teddy bear stickers, 6 doll stickers, and 7 toy car stickers. She drew 2 shelves to display them in her sticker book. If she makes the groups equal, how many stickers should go on each shelf?

Understand the problem.

a. What do you have to find out? _____

_____

Make a plan.

You will need to do two steps to solve this problem. First you will need to **add** to find out how many stickers there are in all.

b. Then you will need to _____ to find how many stickers
go on each shelf.

Try the plan.

c. Solve the problem. Show your work.

d. Write a sentence to answer the question in the problem.

_____

_____

Look back.

e. Reread the problem. Be sure that the question is answered and that the answer is reasonable.

ASSIGNMENT BOOKLET

Go to Assignment Booklet 4B.

DAY 18: LOOKING BACK

It's time to show your teacher what you have learned about multiplication and division by completing some review questions in your Assignment Booklet. You may want to look back through your Student Module Booklet if you have difficulty with any of the questions.

You will also do a timed exercise to send to your teacher.

Go to Assignment Booklet 4B. When you have completed the assignments for Day 18, read what Sarah wrote to Luke to recall all that you have learned. Then fill out the Student's Checklist and write your comments before you submit your work to the teacher.

SUMMARY

Sarah was excited about writing back to Luke. She couldn't wait to tell him her news.
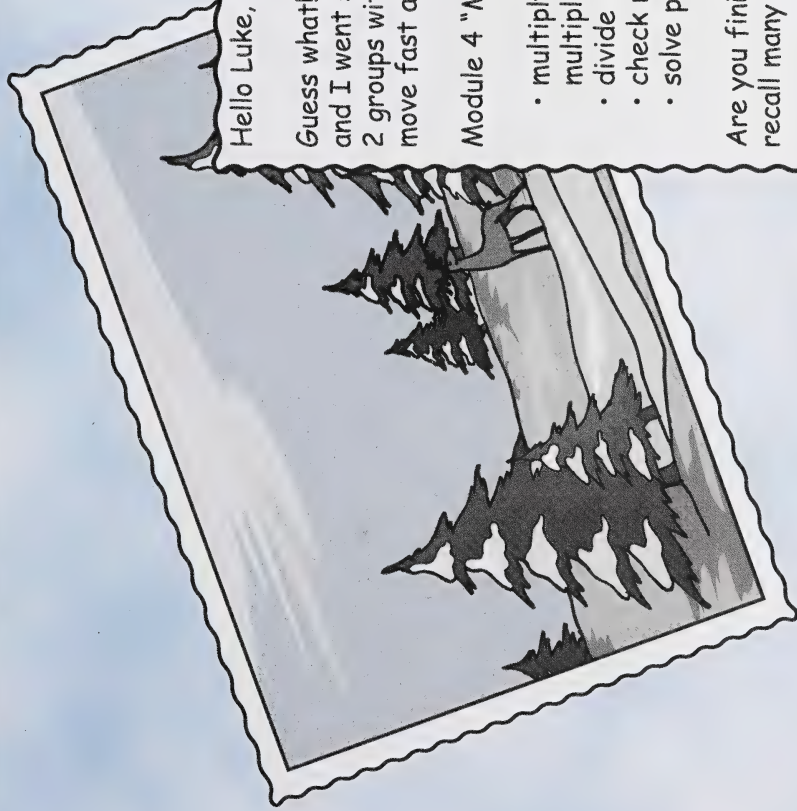
Hello Luke,

Guess what! I got cross-country skiis for my birthday! Yesterday, Dad and I went skiing to the creek, and we saw some mule deer. I counted 2 groups with 6 and 3 others off by themselves—15 deer! They sure can move fast and jump high! They are so different than our farm animals.

Module 4 "Multiplication and Division" has shown me how to

· multiply using counters, pictures, arrays, patterns, and multiplication tables
· divide using counters, pictures, arrays, and number families
· check my work and estimate answers
· solve problems using multiplication and division

Are you finished Module 4? I like learning the multiplication table. I can recall many facts, too. What is your favourite way of solving problems?
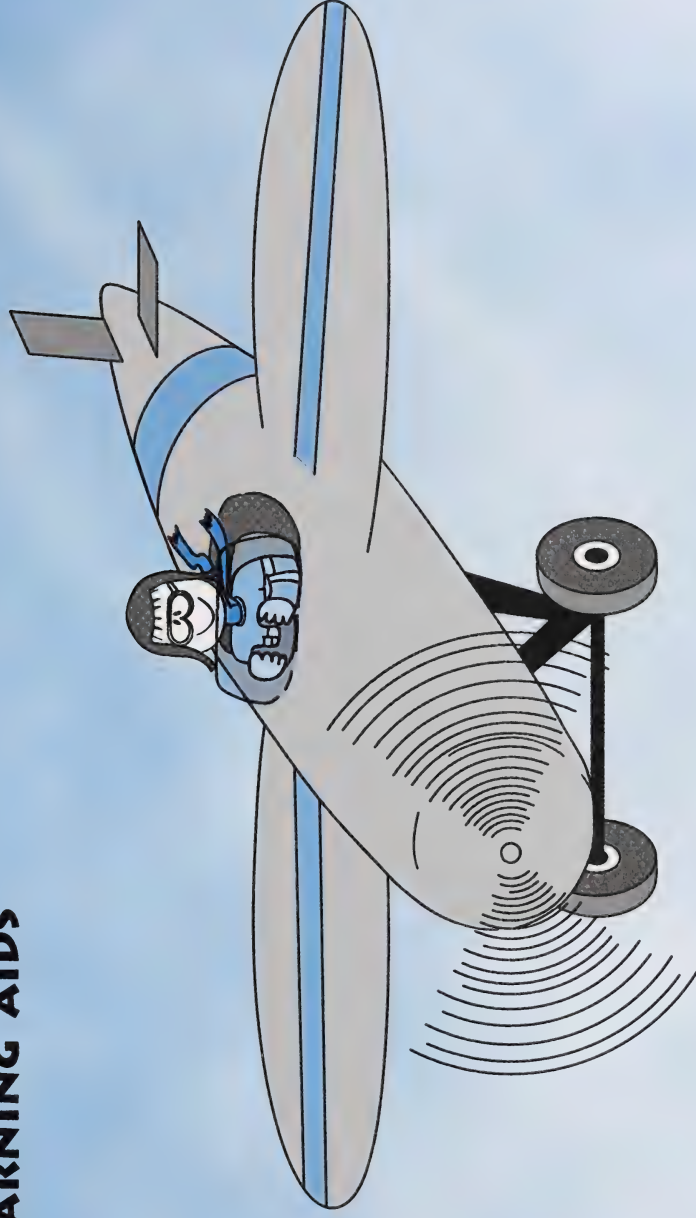
Your cousin on the farm,
Sarah

APPENDIX

GLOSSARY
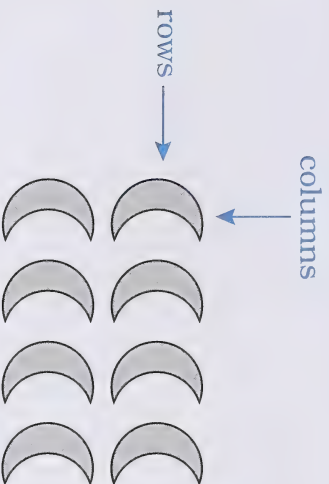IMAGE CREDITS
CUT-OUT LEARNING AIDS

GLOSSARY

The following words are defined in a mathematical context as used within this module. You may find these definitions helpful when explaining concepts to your student.

array: an arrangement that shows objects in rows and columns

Example:

columns

rows ——→

$2 \times 4 = 8$

division: the process of sharing a number of items to find how many equal groups can be made or how many items will be in a group

Division is the opposite or inverse operation of multiplication.

---

dividend: the number that is being divided in a division problem

Example: $16 \div 4 = 4$ or $4\overline{)16}$ ←——dividend

dividend

divisor: the number that divides the dividend

Example: $16 \div 4 = 4$ or $4\overline{)16}$

divisor   divisor

equal groups: collections that each have the same number.

An example of using equal groups is when you skip count by 2s, 5s, or 10s.

fact family: the four number sentences that show how three numbers are related

Example:

$3 \times 2 = 6$ $6 \div 2 = 3$

$2 \times 3 = 6$ $6 \div 3 = 2$

factor: a number that is multiplied by another number to find a product

Example: $2 \times 4 = 8$

factors

inverse: opposite

multiplication: the process of finding the total number of items that are in a certain number of equal groups

multiple: a number that is the product of a given number multiplied by a whole number such as 1, 2, 3, and so on

Example:

2	3	4	5
$\times 2$	$\times 2$	$\times 2$	$\times 2$
4	6	8	10

← multiples of 2

multiplication: the process of finding the total number of items made up by a certain number of equal groups

Example:

$2 \times 4 = 8$
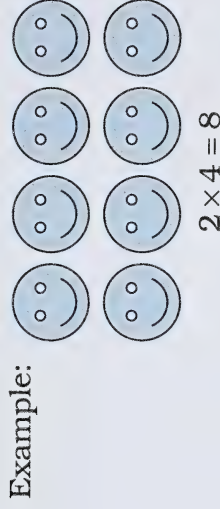
product: the answer to a multiplication problem

quotient: the answer in a division problem

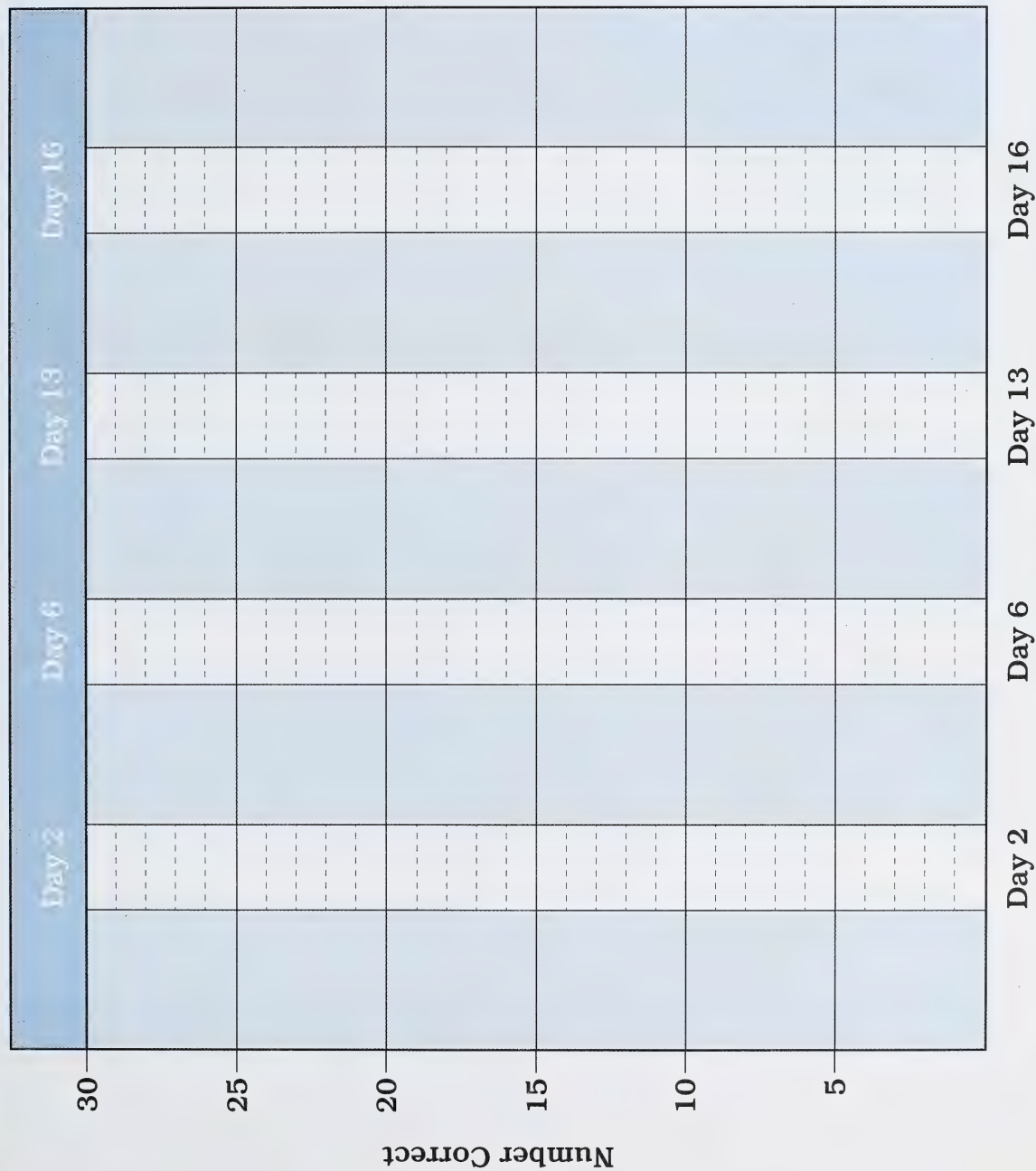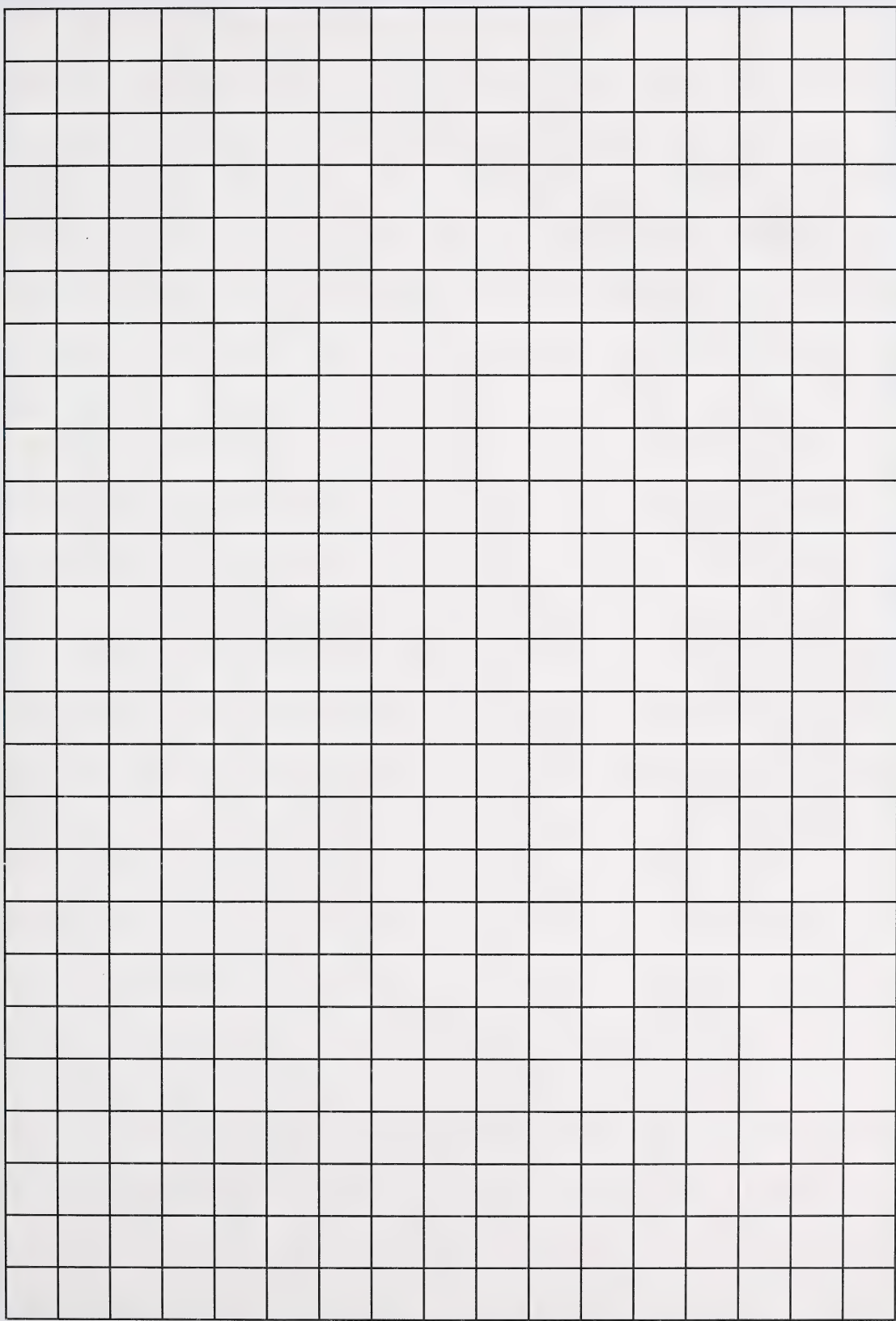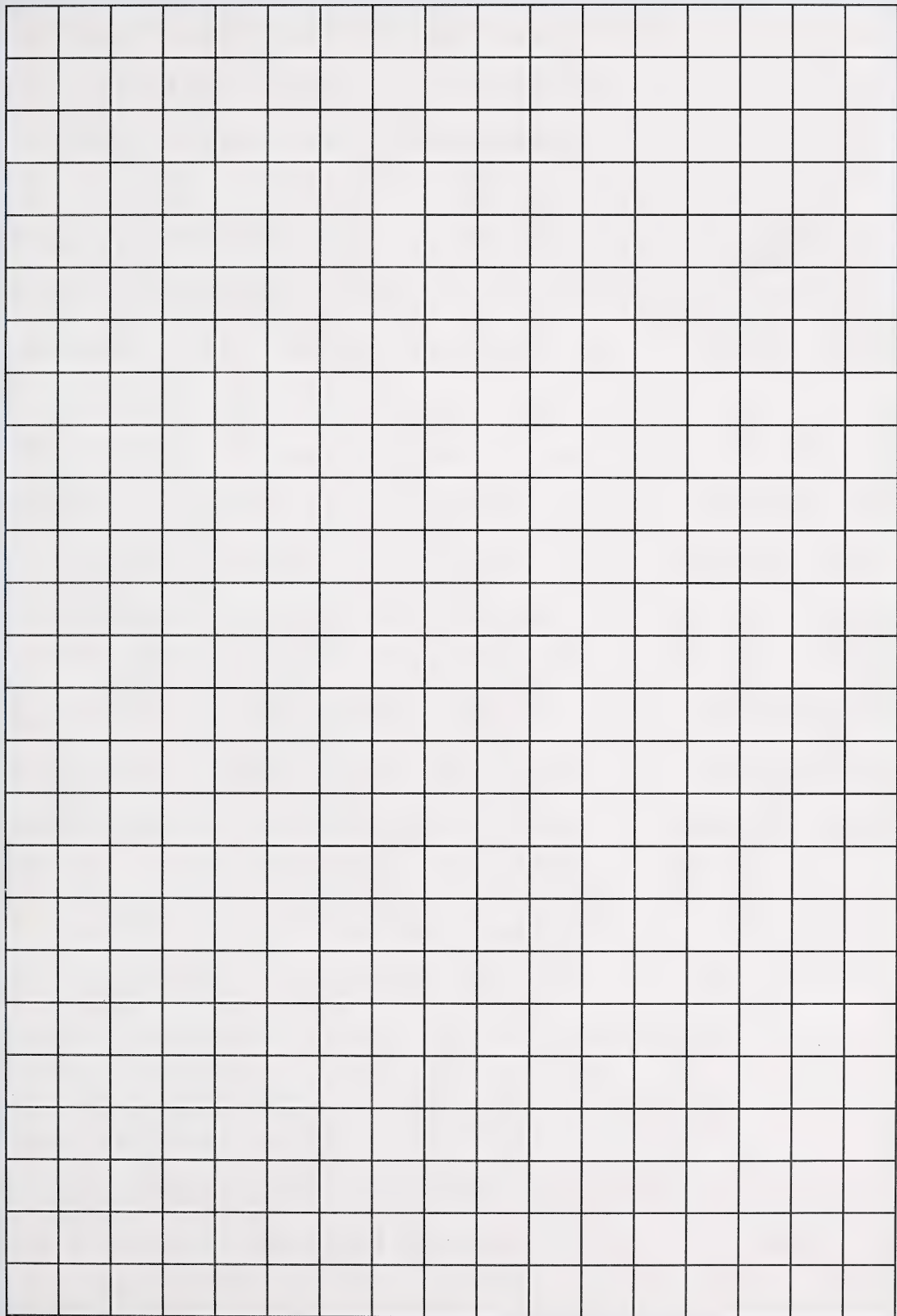**remainder:** the number that is left over after dividing into equal groups.

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IMAGE CREDITS

PAGE

MATH FACTS GRAPH FOR MODULE 4
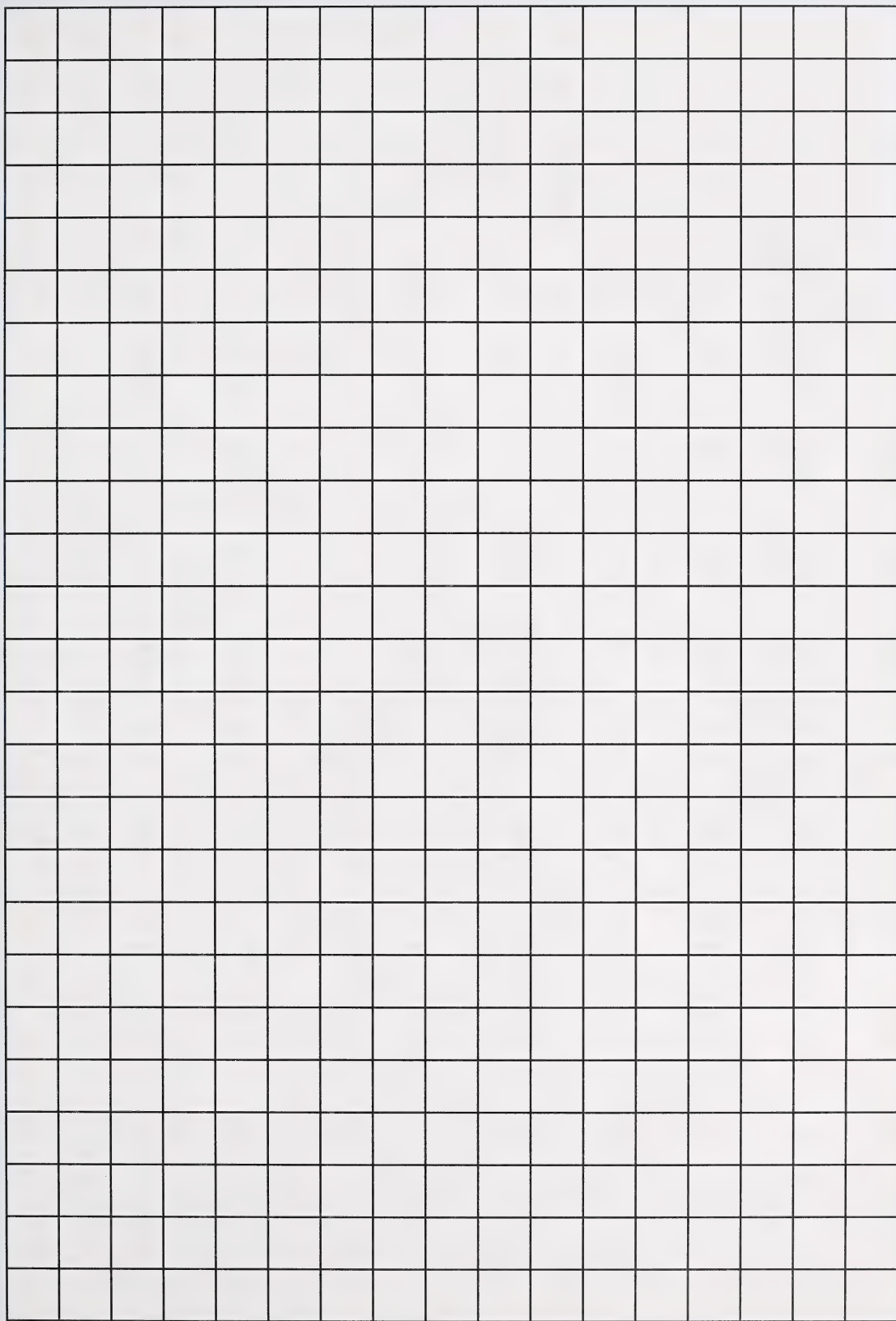
	Day 2		Day 6		Day 13		Day 16	

Number Correct

30

25

20

15

10

5

Day 2   Day 6   Day 13   Day 16

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

MULTIPLICATION TABLE

×	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										

$4 \times 4 =$	$4 \times 6 =$	$4 \times 7 =$
$4 \times 8 =$	$6 \times 6 =$	$6 \times 7 =$
$6 \times 8 =$	$7 \times 7 =$	$7 \times 8 =$
$8 \times 8 =$		